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UNIVERSITY OF ALBERTA

PERCEIVED CONTINUING EDUCATION NEEDS OF DENTISTS IN ALBERTA

BY

MARJORIE J. SANDILANDS

©

A thesis
submitted to the Faculty of Graduate Studies and Research
in partial fulfillment of the requirements for
the degree of Master of Education

In

ADULT AND HIGHER EDUCATION

DEPARTMENT OF ADULT, CAREER AND TECHNOLOGY EDUCATION

EDMONTON, ALBERTA
SPRING, 1994

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ISBN 0-612-11354-X

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UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Perceived Continuing Education Needs of Dentists in Alberta submitted by Marjorie J. Sandilands in partial fulfillment of the requirements for the degree of Master of Education in Adult and Higher Education.

A. G. Konrad, Supervisor

G. W. Thompson, Committee Member

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J. M. Small, Committee Member

Date: March 24, 1994

ABSTRACT

The purpose of this study was to identify the perceived learning needs, preferred learning activities, current practice patterns and demographic characteristics of dentists in Alberta and to identify relationships among them. The findings will be shared with the ADA and the Faculty of Dentistry, UofA, and may ultimately be used in the planning, development, and implementation of CDE programs in Alberta.

A descriptive survey method was employed utilizing a questionnaire to obtain the data. The majority of the questions included in the questionnaire were closed-ended. The questionnaire was divided into three sections and included questions regarding perceived learning needs, preferred learning activities, current practice patterns and demographic characteristics. The questionnaire was piloted by six dentists from British Columbia. A random sample of 300 Alberta dentists was surveyed and the response rate was 60% or 180 responses. The data on perceived learning needs, learning activities, current practice patterns and demographic characteristics were analyzed using descriptive statistics. Comparisons of the data were done through the use of t-tests and F-tests. The qualitative data were analyzed according to frequency of responses and themes.

The findings of this study indicated that: 1) Alberta dentists have a high interest in continuing education; 2) They are satisfied with the quality of continuing education (CE) courses that are currently being offered; 3) Overall, their current CE needs are being met; 4) They have a need for more hands on practice in CE courses; 5) Forty-one anticipated learning needs were ranked as "moderate" needs. Dental materials, used in esthetic and operative dentistry, and dental materials, in general, were ranked as the highest of these needs; and 6) Barriers to the pursuit of continuing education

included courses which are not relevant to their needs, and courses offered at inconvenient times and locations.

Conclusions from this study included: 1) The Alberta CDE activities should be coordinated either through the Faculty of Dentistry, UofA, or the ADA; 2) Consideration should be given to the adoption of a CPE model that addresses changes in performance; and 3) Consideration should be given to the recruitment of a dentist, specializing in the theory and research related to dental materials, for the Faculty of Dentistry, UofA.

ACKNOWLEDGEMENTS

There are many people whose support and assistance I would like to acknowledge. I would sincerely thank Dr. Abe Konrad for his expertise and patience during the development of this study and the completion of this thesis. The assistance of Dr. G. Thompson and Dr. J. Small as committee members was very much appreciated. I would also like to thank Chetwyn Chan for his assistance in the data analysis and Jennifer Beamer who served as my research assistant.

I would like to acknowledge my gratitude to the following three very special people: Dr. A. Konrad, Dr. P. Brook and my husband, Dick. Dr. Konrad and Dr. Brook reopened a door for me that I thought was closed for ever and provided understanding, support and flexibility as I attempted to juggle my personal life, part-time studies and full-time work, in a turbulent and every changing environment. Dick loved, supported and encouraged me and most of all, unselfishly shared our time so that I could complete this program.

I would also like to sincerely thank other members of my family and in particular, I would like to acknowledge Kathryn, Bryan and Berni for their love, interest and encouragement.

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CHAPTER I

INTRODUCTION

The need for continuing education for health care professionals has grown considerably since World War II. As a result, continuing professional education (CPE) is emerging as an area of special interest within the field of adult education and within the professions. Some professionals would argue that it is the duty and responsibility of professionals to maintain their skills and knowledge. The professional organizations acknowledge that professions are self regulating and, as such, are responsible for the competency of their members. The general public today is well informed and wants assurances that professionals are knowledgeable, skilled and prepared to deliver professional services in a competent and safe fashion. As a result, the issue of continuing education for professionals has been the focus of considerable discussion.

Obstacles to the adoption of mandatory continuing education for professionals include the limited research demonstrating the efficacy of continuing education programs on practice (Bader, 1987; Cervero, 1988; Chambers, 1972; Young & Rudney, 1991) and the lack of understanding about the ways in which professionals continue to learn and develop. In 1988, the Canadian Dental Association (CDA) Teaching Conference on Continuing Dental Education recommended that priority be given to research which would result in improving the identification of learner needs and determining the effectiveness of current continuing dental education (CDE) programs. The preference was to focus on the positive aspects of continuing education for dentists, for their practice and, most importantly, for their patients, since mandating attendance does not ensure learning or behavioral change. Bader (1987) cautioned that CDE is particularly important for dentists because they tend to be isolated in their practice, spend less time reading professional journals, have less exposure to pharmaceutical representatives and have fewer institutional collegial contacts than physicians. Nakamoto and Verner (1972) supported the unique position of dentistry and referred to the following excerpt in the Report of the Committee on the Healing Arts,

> Because they are so independent, dentists may find it relatively difficult to keep up with the development of dental techniques, and they may not be as exposed to the kinds of quality controls that physicians experience through hospital and other control institutions required for the treatment of their patients. (p. 74)

At the present time, the four western provinces require mandatory continuing education for dentists. Nova Scotia will soon be joining this group. Although the requirements of these provinces are similar, according to Dr. B. Leroy, Registrar of the Alberta Dental Association (ADA), the requirements for Alberta dentists provide the most flexibility in course selection. Fourteen hundred and twenty-seven Alberta dentists, which include 152 specialists, are each required to attend 150 hours of continuing education offerings in a five-year period for relicensure. One hundred hours are required in the technical, clinical or scientific realm and 50 hours may or may not be directly related to the practice of dentistry, but must be offered by a recognized educational institution, organization or sponsor. This flexibility in selection is supported by O'Neill (1986) who suggested that "In CDE today, a focus on clinical courses, while necessary, is no longer sufficient to address the tremendous range of forces which impinge upon the dental profession" (p. 14). Quality courses are currently offered by the University of Alberta, by the local dental societies, by the provincial association and by a variety of other program sponsors. The University of Alberta (UofA), Faculty of Dentistry programs are coordinated by Dr. S. Patterson, Director-Continuing Education.

Dr. S. Patterson and Dr. G. Thompson, of the UofA, Faculty of Dentistry, sent a questionnaire on continuing education to all dentists in Alberta and in the Atlantic provinces in 1989. They gathered data on factors affecting course choice, sponsor effectiveness, perception of the importance of continuing dental education and interest in mandatory continuing education. The results of their study (Patterson & Thompson, 1990) and of studies conducted by Boissoneau (1980) and Milgrim (1978) indicated that the key factors in the decision making process to choose continuing education courses were course content, course speakers and course location. Patterson and Thompson (1990) also suggested that "In order to ascertain the areas of content that dentists would be most interested in attending, frequent needs assessments or interest surveys should be conducted which would allow program planners to provide the profession access to the information that they desire" (p. 1079).

The Director-Continuing Education and an advisory committee, made up of faculty members from the UofA, Faculty of Dentistry and practicing dentists in Alberta, have utilized the following informal processes to determine educational needs:

- request(s) from individual ADA members
- request(s) from a group within the ADA
- requests outlined on program evaluations
- faculty identification of new techniques, equipment, procedures and supplies, substantiated by valid research
- high registration numbers for a particular course
- intuition

- review of Academy of Dentistry publications which outline current topics of high interest/high attendance.

The department sent out an interest inventory to Alberta dentists approximately two years ago so that continuing education programs could be developed in response to their expressed interests. Dr. S. Patterson (1993) indicated that a comprehensive CDE needs assessment of Alberta dentists is required. The resulting information would facilitate the development of effective programs for these professionals as they strive to maintain their competency during a period of ever expanding knowledge, of rapidly increasing new technology, materials and procedures and of changing patient needs.

Purpose of the Study

The purpose of this study was to identify the perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics of Alberta dentists and to identify relationships among them. A number of specific research questions served to guide the development of the study and the analysis of the data. These questions were as follows:

1. What are the perceived continuing education needs of Alberta dentists?
2. What are their preferred learning activities?
3. What are their current practice patterns and demographic characteristics?
4. What relationships exist among their perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics?

Significance of the Study

Through a review of the research literature to determine how the continuing education needs of professionals, in general, and of dentists, in particular, have been identified, it became apparent that interest inventories were frequently utilized. An interest inventory is a useful alternative to a comprehensive needs assessment for justifying and focusing program offerings (Barbulesco, 1980; Beach, 1982; Bell, 1978; Bhat & Cohen, 1987; Body, 1987; Escovitz & Augsburger, 1991; Graham & DeMarais, 1976; Houle, 1972; Knox, 1990; Kress, 1979; O'Neill, 1986; Smith, Smith & Ross, 1982; Young, 1991; & Young 1985). However, according to Sork (1987) and Woolfolk, Lang, Farghaly & Faja (1991), a demonstrated interest or intention does not always match actual participation.

The results of this study will be helpful to those involved in the planning, development, and implementation of continuing education programs for Alberta dentists which should, in turn, result in offerings that better meet the continuing education needs of this target group.

Definition of Terms

A number of terms used throughout this study have been defined to ensure consistent usage.

Competent/effectiveness. For the purpose of this study, Boissoneau's (1980) definition was used which defines these synonyms as "... a desirable state of practice" (p. 2).

Continuing education (CE). According to Boissoneau (1980), a generally accepted definition was non existent. He proposed a definition that "... continuing education is that part of education that the learner addresses after a formal education program has been completed or after a position has been obtained" (p. 1). It is involved, according to Boissoneau (1980), with the "... acquisition of new knowledge, skills and attitudes" (p. 4) by professionals in order to maintain their effectiveness.

Continuing dental education (CDE). For the purpose of this study, CDE was defined as an educational means of improving the performance of practicing dentists, so that they are able to provide higher quality service to their patients.

Continuing professional education (CPE). In this study, CPE was defined as an educational means of improving the performance of professionals so that they are able to provide higher quality service to their clients/patients.

Learning needs. For the purpose of this study, learning needs were defined as the personal and professional needs that represent gaps or discrepancies in knowledge, skills and attitudes required by competent practitioners.

Mandatory continuing education. Mandatory continuing education was defined as the requirement for members of a professional organization to attend a stated number of hours of professional education for relicensure.

Needs assessment. According to Young & Rudney (1991), a needs assessment is a data gathering process that is carried out to identify and analyze learners' perceived learning needs.

Perception. For the purpose of this study, perception was defined as an individual's intuitive judgment, based on previous experiences and present knowledge.

Population-specific needs. According to Williams & Butters (1991), population-specific needs was defined as societal needs that can be utilized in the development of CDE/CPE course offerings.

Profession. Boissoneau (1980) defined a profession as having all of the following characteristics: "... a distinct body of knowledge, a desire for autonomy, restriction of entry into practice, a stated code of ethics, a service orientation toward the public, a professional body for representation, peer review for evaluation purposes and continuing education needs" (p. 2).

Professional. For the purpose of this study, a professional was defined as a member, in good standing, of a profession.

Assumptions

Several assumptions were made in this study. It was assumed that Alberta dentists shared common personal and professional learning needs and that they were able to identify these needs from options listed in a questionnaire.

It was assumed that respondents completed the questionnaire honestly and to the best of their ability, and that the questionnaire was a valid and reliable method for gathering empirical data regarding dentists' perceptions of their CPE needs.

It was also assumed that there were relationships among the demographics of type and nature of practice, employment status, gender, year of graduation, location of practice, and their perceived continuing education needs and preferred learning activities.

Delimitations

This study was delimited to a three-month period in which data collection was conducted. The needs and opinions of the respondents were relevant at the time of data collection but may no longer be so.

The study was delimited to the population of a comprehensive listing of 1427 dentists in Alberta. The listing included professionals involved in general practice, in the practice of specialties and in education and research.

The study was further delimited to a random sample of 300 Alberta dentists who received the questionnaire and to the places in which the questionnaires were distributed, which included both urban and rural centres in Alberta.

Limitations

The study was limited by the instrument that was developed and utilized for data collection of both quantitative and qualitative data. The inherent limitations of questionnaires were recognized such as the possible misinterpretation of questionnaire items and the limited depth of information obtained.

Not all randomly selected dentists responded to the survey. The non respondents could represent a biased sampling of individuals because they may have responded in ways that were markedly different from the responding group, particularly if their lack of response was related to a disinterest in CDE. The findings may be more representative of Alberta dentists with an expressed interest in CDE.

Organization of the Thesis

Chapter I provides a statement of the purpose of the study and the four research questions that were investigated. In addition, the significance of the study, a definition of terms, the assumptions, limitations and delimitations of this study were outlined.

Chapter II contains a review of the relevant literature related to the purpose of this study. The literature review, which concentrated on the continuing education needs of health care professionals, in general, and of dentists, in particular, focuses on four main areas: conceptual frameworks for CPE, continuing education needs of health care professions, continuing education needs of dentists and needs assessments.

Chapter III provides a description of the research methods used in the study. The aspects of general design, sample selection, ethical considerations, instrument development, data collection, organization and analysis are explained.

A descriptive review of the findings of this study is provided in Chapter IV. Section 1 contains a description of the perceived learning needs of responding Alberta dentists. The preferred learning activities of responding Alberta dentists are outlined in Section 2. Section 3 contains a description of the respondents, including current practice patterns and demographic characteristics and relationships among these patterns and the perceived learning needs and preferred learning activities.

Chapter V includes the summary, conclusions, implications of the study and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

The review of the literature began through a systematic search of computer references by subject and title. Use was made of computer searches using MEDLINE, 1985 to present, Health, 1975 to present, and ERIC, 1980 to present. Other references such as dissertations and bibliographies of relevant sources were utilized.

There was a dearth of literature specifically focusing on the continuing education needs of dental professionals in Canada. For this reason the literature review encompassed related topic areas from Canada and the United States. The review focused on the role of professions in society, learning in the professions, models of CPE, continuing education needs of health care professionals and related research contributions. Finally, the importance of needs assessment to program planning was examined.

The Role of Professions in Society

This first section of the literature review deals with the changing role of professions in society. It attempts to define the various roles and explain the implications that each role has for CPE.

According to Cervero (1988), there are several viewpoints in existence regarding the role of the professions in society. Historically, professions and professionals have been altruistic and have been valued by society. He cited, however, that by the late 1960s, "the public's evaluation of the professions began to shift from approval to disapproval" (Cervero, 1988, p. 16), giving rise to diverse viewpoints about the place of professions in society.

Cervero (1988) reviewed three distinct viewpoints and their CE implications. The dominant American viewpoint, functionalism, evolved from the belief that the "... professions are service- or community-oriented occupations that apply a systematic body of knowledge to problems that are highly relevant to the central values of society" (Rueschemeyer, 1964, p. 17). According to Cervero (1988), from this viewpoint, professionals are highly valued by society and richly rewarded for their knowledge and altruistic orientation. The role of CE, from this viewpoint is to assist professionals in providing "higher quality service to clients by improving their knowledge, competence, or performance" (Cervero, 1988, p. 25).

Cervero (1988) explained that the conflict viewpoint began to emerge during the 1960s. He suggested that the conflict viewpoint arose from the perspective that "...professions are in conflict with other groups in society for power, status, and money. They use knowledge, skills, and altruism as a form of ideology in their quest for these social rewards" (Cervero, 1988, p. 26). The implication of this viewpoint for CE includes the perspective that educational intervention must be directed at the social-structure level; intervention at the individual level would be of little value when professional behavior continues to be reinforced by formal education, institutions of employment, and by clients (Cervero, 1988). Shon's (1983) model of professional practice acknowledged that each profession has a knowledge base that "... is specialized, firmly bounded, scientific and standardized" (p. 23). He called this knowledge technical rationality. Cervero (1988) suggested that Schon's (1983) concept of knowledge was consistent with the functional and conflict viewpoints.

According to Cervero (1988), the critical viewpoint emerged during the 1970s and 1980s. From this perspective, professions must "... find or construct problems from ambiguous situations. Thus, problem setting rather than problem solving is the key to professional practice" (Cervero, 1988, p. 31). Because of this profound change in focus, consensus about professional quality became elusive. The implication of this viewpoint for CE includes the perspective that ethical, political and technical dimensions of professional work must be considered.

Schon (1987) acknowledged that his model of technical rationality did not deal with the ambiguities associated with the critical viewpoint. He subsequently identified two additional forms of knowing called knowing-in-action and reflection-in-action. He suggested that knowing-in-action occurs when professionals make judgments and decisions but are unable to state the rules or theories upon which they are based. Because professionals continually face situations that are unique or ambiguous, knowing-in-action is insufficient (Cervero, 1988). To deal with these circumstances, professionals reflect on previous situations and bring knowledge gained into this new set of circumstances. This process was named reflection-in-action by Schon (1987). According to Bennett and Fox (1993), professionals within a profession do not necessarily understand problems in the same way and "standardized solutions may not fit the context of a specific problem" (p. 264). Bennett & Fox (1993) supported Schon (1987) by acknowledging that a professional knowledge base is built, in part, by the experience gained from specific cases in professional practice which are, in turn, used to help shape the response to current problems.

Schon (1987) suggested that formal CE programs should provide opportunities for practitioners to "... learn to reflect on their own tacit theories of phenomena of practice, in the presence of representatives of those disciplines" (p. 321). Cervero (1988) cautioned continuing professional educators not to dismiss the importance of technical knowledge but to consider ways of integrating it into the practical knowledge of professionals. Bennett and Fox (1993) suggested that "CPE must depart from education based on certain knowledge (scientifically valid or technically correct) and move into the swamps of 'maybe' and 'sometimes' " (p. 277).

Learning in the Professions

In this section of the review of the literature, the nature of learning, the role of CPE in continuing learning, the modes of learning and categories of learners are discussed.

Nowlen (1988) suggested that professionals are involved in the process of continuing learning. He defined continuing learning as self-directed learning, informal learning experiences, professional mentoring, job related learning, and continuing education; he suggested that CE plays a minor role in the larger phenomenon called continuing learning. Cervero (1988) supported Nowlen by stating that "... professionals learn from a variety of activities, only one of which is formal instruction" (p. 59). Bennett and Fox (1993) suggested that "most learning associated with changes in practice is directed by professionals as opposed to curriculum planners in CPE" (p. 275).

Houle (1980) developed a model which was helpful in depicting the stages of a professional's career and the relationship of CPE to those stages (see Figure 3.1). Houle (1980) also identified three "... major and overlapping modes of learning" (p. 31). He described these modes as inquiry, instruction and performance. Houle defined the mode of inquiry as:

> the process of creating some new synthesis, idea, technique, policy, or strategy of action. Sometimes this mode is employed in a structured fashion; discussion and encounter groups, seminars, clinics, and guided experiences can be used to help people achieve new ideas or new ways of thinking, though the outcomes of the process cannot be predicted in

> advance. More frequently in this mode, learning is a by-product (though sometimes an intended by-product) of efforts directed primarily at establishing policy, seeking consensus, working out compromises, and projecting plans. (p. 31)

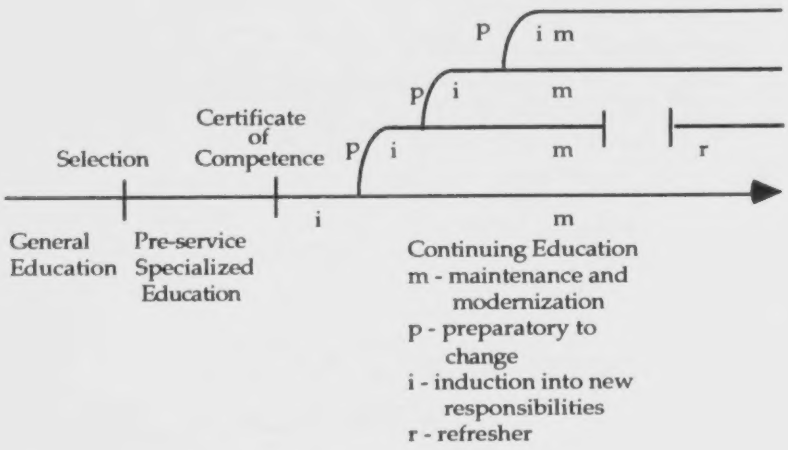
P
i m
p
i
m
Certificate of Competence
Selection
P
i
m
r
i
m
General Education
Pre-service Specialized Education
Continuing Education
m - maintenance and modernization
p - preparatory to change
i - induction into new responsibilities
r - refresher

Figure 3.1 An Emerging Model of Professional Education (Houle, 1980, p. 106).

He defined the mode of instruction as:

> the process of disseminating established skills, knowledge, or sensitiveness. Those who use it assume that the teacher (a person, book, or any other source) already knows or is designed to convey everything that the student will learn .... The degree of success of the mode of instruction is measured by the achievement by the student of goals that are usually known to the teacher at the beginning of a learning episode--though they may be modified during the process. (p. 32)

Houle (1980) defined the mode of performance as:

> the process of internalizing an idea or using a practice habitually, so that it becomes a fundamental part of the way in which a learner thinks about and undertakes his or her work. In pre-service professional education, the mode of performance is used chiefly in "practical" or clinical teaching, where it is inculcated by drill, by close supervision, by clinical presentations, and by long continued demonstration on the part of those who provide instruction. During the years of practice, the

> mode of performance may be fostered by the formal use of other modes of learning, but it may also be reinforced by rewards and punishments that require individuals and groups to maintain and improve their abilities and to avoid obsolescence. (p. 33)

Cervero (1988) recommended that Houle's modes of learning would be more appropriately called modes of participation. His rationale was based on his conception of these terms. He believed that the term learning should be reserved for processes resulting in cognitive changes and that the term participation should be used for activities that provide the potential for learning. Cervero (1988) acknowledged the importance of Houle's modes of learning because they provided insight into the importance of these activities and they broadened the concept of learning to include more than formal educational programs.

According to Cervero (1988), educators have been concerned with effectively fostering participation in CE activities. Knox (1985) proposed a framework that suggested that "... personal and situational influences effect the learner's motivation" (p. 289) to participate in educational activities. Cervero (1988) acknowledged that research has concentrated on asking "... professionals about the reasons for and deterrents to participation" (p. 63).

As well as defining the modes of learning, Houle (1980) defined five categories of learners; the categories appeared to influence participation in CE activities. Innovators are individuals who are involved in continuous performance improvement and are interested in untested practices and concepts. Pacesetters are progressive practitioners, who are interested in new ideas. The largest group is the middle majority. The laggards learn the bare minimum to stay in practice. The final group, the facilitators, are composed of professionals who advance the profession but aren't engaged in active practice. These individuals can possess the traits of any of the other four groups. According to Cervero (1988) a "professionals' participation in educative activities is related to their zest for learning" (p. 69), their reasons for and deterrents to participation, their age and career stage, their practice setting and the extent to which they are required to participate in CE. Bennett and Fox (1993), Chambers (1977), Crawford (1993), Kicklighter (1984) and Young and Willie (1984) cautioned that attendance is no guarantee of learning.

Models of CPE

This section of the literature review deals with models of CPE as proposed by Nowlen (1988) and Belsheim (1986) and the implications that these models have for program planning and development. Nowlen (1988) described three models of CPE -- the Update Model, the Competence Model and the Performance Model. Belsheim (1986) reviewed three additional models which he called an Education Model, a Change Model and a Problem-based Model.

Update Model

In the Update Model the goal of teaching is to keep professionals up to date in their practice (see Figure 3.2). According to Nowlen (1988), this model accurately reflects the current field of CPE. He acknowledged the shortcomings of this model, including "being up to date is only one aspect of the relationship of knowledge and skill to competence" (p. 31) and "updates maintain or enhance the competence of only some persons, some of the time" (p. 31). Nowlen (1988) described this as being a curriculum driven way of conceptualizing CPE.

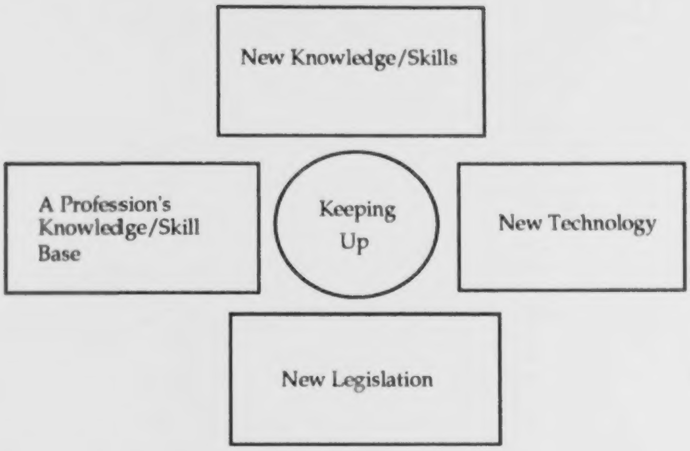

Figure 3.2 Update Model (Nowlen, 1988, p. 24).

Competence Model

Nowlen (1988) described the Competence Model as a means of assisting professionals in becoming and remaining competent (see Figure 3.3). He defined competence as possessing "... sufficient knowledge and ability to meet specified requirements in the sense of being able, adequate, suitable, and capable" (p. 32).

The range of CE programs evolving from the Competence Model are more varied than those arising from the Update Model (Nowlen, 1988). The Competence Model focuses on the individual and is based upon the assumption that performance is an individual matter. These have become the most serious flaws of this model.

Performance Model

According to Nowlen (1988), the Performance Model has evolved because of an understanding that "... performance is the result of interacting social and personal influences" (p. 86) (see Figure 3.4). This model is more inclusive than either the Update Model or the Competence Model and considers collective performance as well as individual performance (Nowlen, 1988).

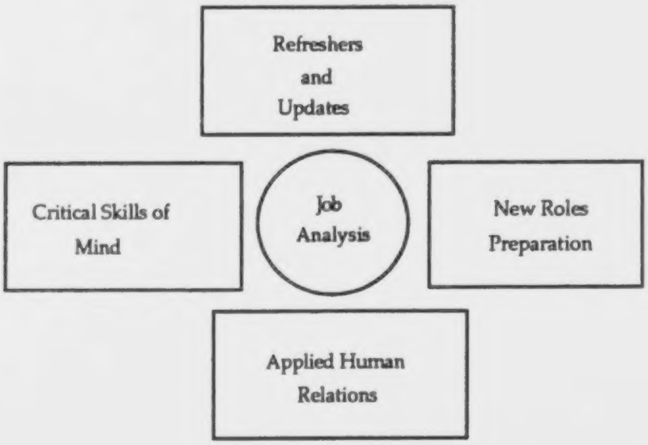

Figure 3.3 Competence Model (Nowlen, 1988, p. 32).

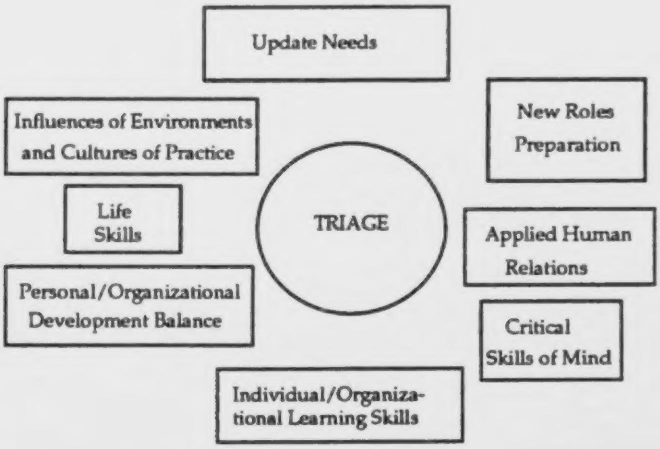

Figure 3.4 Performance Model (Nowlen, 1988, p. 87).

Education Model

Belsheim (1986) credited Tyler (1950) for the development of the education model which focused on the content or knowledge to be learned by the participants. Typically, the use of this model in CPE results in a needs assessment of potential participants. According to Belsheim (1986), the results of assessment may influence the topics offered but infrequently affect the development of objectives for specific topics. The subsequent result can be a superficial approach to meeting the real needs of participants. In addition, "designers of CPE programs tend to select educational methods that are familiar to them and to the organization responsible for the CPE program" (p. 972).

Belsheim (1986) cautioned those using this model to consider the desired outcome, a change in practice, when selecting methods of delivery. In his opinion, CPE is a secondary function for most educational institutions and the focus on profit results in the selection of CPE topics designed to appeal to the largest number of participants. Time constraints and financial incentives have promoted efficiency in design and presentation, often at the expense of effectiveness. Program evaluation, in the education model, focuses on the attainment of course objectives and on participants' satisfaction with the program. According to Belsheim (1986), these measures fall short of determining what is relevant or what should be taught and are therefore superficial rather than comprehensive in nature.

Change Model

The change model, proposed by Warren (1977), focused on the system within which CPE occurs. Belsheim (1986) felt that it should be considered as a CPE model if the objective of CPE is a change in participants' practice. The components of the change model are "... the change objective, the target system, strategies for change, resistance to change, and stabilization of change" (Belsheim, 1986, p. 973). Warren (1977) described the desired change as the change objective but the emphasis was on the total environment in which the individual practices. In the change model, the target system referred to elements in the environment or systems within which the participants' practice must be considered in order to effect change in participants' behavior. If a readiness to accept change exists within the environment, individual change will be facilitated. Warren (1977) referred to the change-inducing systems as the group or organization that attempted to initiate change.

Belsheim (1986) suggested that the use of leaders in the field and a genuine commitment to a given change, are critical to successful change. Belsheim (1986) described the change agent in CPE as "... the individual or group that designs an effort to introduce change ..." (p. 974). He suggested that different instructional methods would be utilized at different times during the change process, and that resistance was a key element in the change model of CPE. Belsheim (1986) cautioned that resistance to change may be related to "... habit, disruption, organizational policies, vested interest, ideology, and even psychopathology ..." (p. 975) and that these factors could supersede a rational commitment to change behavior. Program designers using this model in CPE would be required to analyze resistance to change when selecting strategies to promote change. Belsheim (1986) described the need to prepare the participants and organizations for the withdrawal of the program during the maintenance of the change phase.

Problem-based Model

The problem-based model of CPE described by Belsheim (1986) focused on highly skilled professionals rather than on the heavy reliance on "experts" that was evident in the education and change models. "There is strong rationale for stimulating professionals' positive attitudes toward learning and change by involving them as professionals rather than as passive recipients" (Belsheim, 1986, p. 975).

In this CPE model "the focus is on problems and solutions rather than on the participants' lack of knowledge" (Belsheim, 1986, p. 977). The designers would focus on problem analysis performed by a planning group consisting of content experts, practitioners and a program development expert. The results of problem analysis would provide a focus and a restatement of the problem to be resolved. Specific cases would then be recommended or developed and would serve as the core elements of instruction in the program. Belsheim addressed the level of complexity of the problems used for instruction but he did not address the issue of evaluation in this model. In Belsheim's (1986) opinion, "this approach leads participants and faculty members to bridge the gap between scientific and professional knowledge" (p. 977).

Continuing Education Needs of Health Care Professionals

In this section of the review of the literature, the purposes of CPE are discussed, the issues surrounding program development are reviewed and the implications for program delivery are outlined. Relevant research is outlined regarding the linkages between CPE and performance, program characteristics that influence selection, deterrents to participation in CPE, perceived effectiveness of CPE instructional formats, and perceived educational needs.

Prior to World War II, professionals did not perceive the need for continuing education (Baralt, 1965; Gaynor, 1980; Hozid, 1969; Kress, 1979; Mann, 1964; Massler, 1970; McGuire, 1993; Rudd, 1988). However, with the rapid increase in new knowledge, technological and social change, professional groups began to seek continuing education as a way of maintaining competencies and of coping with change (Abrahamson, 1984; Barrett, 1988; Bennett, 1990; Boissoneau, 1980; Crawford, 1993; Dreier, 1976; Frandson, 1981; Knox, 1990; McLaughlin & Donaldson, 1991; Patterson & Thompson, 1990; Stein, 1981; Young & Rudney, 1991). According to Knapp (1992), half of the knowledge and perhaps the skills of dental school graduates is out of date in five to seven years. McGuire (1993) agreed that the scientific and technical knowledge base doubles every five to eight years, but predicted that it will soon "... begin to double every year in some fields" (p. 8).

Purposes of CPE

Professional organizations and government agencies began to turn to continuing education in the late 1960s to assure the public of the health care professionals' competency (Boissoneau, 1980). Unfortunately, according to Boissoneau (1980), Chambers (1977), Conn (1992), Escovitz & Davis (1990), Kicklighter (1984) and Young and Willie (1984), the direct link between the involvement of professionals in continuing education activities, professional competence and quality health care is unclear, at best. Despite the absence of a cause-and-effect relationship, there is a trend in the health care field to move from voluntary to mandatory continuing education (Anker, 1993; Boissoneau, 1980; Crawford, 1993; Lloyd & Abrahamson, 1979). Cervero (1988) predicted that the future of CE is moving in the direction of rapid growth and development and suggested that "many people believe that systems of continuing education will be built that rival the preprofessional preparation programs now in existence" (p. 2). This represents a dramatic contrast to Houle's (1980) description of a typical CE program: "Faculty members who can be persuaded to do so give lectures on subjects of their own choosing to audiences that they do not know, who have assembled only because they want to put in enough hours of classroom attendance so that they can meet a relicensure requirement" (p. 266). Houle's perspective was a skeptical one but Cervero (1988) acknowledged that professions are definitely concerned with the quality of CE.

Intuitively, educators feel that continuing education contributes to the development of professional competence but Boissoneau (1980) cautioned that it is only one of many factors to measure when evaluating the competence of health care professionals. He cited examples, such as mental disorders, substance abuse and professionals who were intellectually competent or knowledgeable but not competent in their practice, where continuing education would be of little value. In his opinion, continuing education should not be viewed as the solution for all problems of health professionals, but rather as "... a major component in the sustaining effort of health professionals and personnel to maintain their effectiveness" (p. 4). His views were supported by Caplan (1989), Conn (1992), and Craft, Richards & Reed (1992). Cervero (1985) cited Griffith (1981) who cautioned that it was important to distinguish "... between competence (ability to perform a given task according to a set standard) and performance (actual execution of a task, voluntarily, according to set standards) when discussing the outcomes of CPE programs" (p. 86). Griffith (1981) suggested that "education alone can develop competence, but lasting effects on performance can best be accomplished through programs that involve both the upgrading of learner's competence and restructuring of the work environment to stimulate, encourage, recognize, and reward its expression" (p. 91). Bennett and Fox (1993) proposed the need for reform in CPE and outlined the need to "... develop an understanding of the ways in which professionals integrate knowledge from their disciplines into the contexts of their practice" and to "... develop new models of education that are directed toward the process of learning from professional practice" (p. 277).

Houle (1976) claimed that "objective global evidence exists that continuing education is effective in changing practices" (p. 124). His views have been supported by published reports which demonstrated behavior change resulting from CPE programs for dentists (Barrett, 1988; Chambers, Hamilton, McCormick & Swendeman, 1976; Chapko, Milgrom, Bergner, Conrad & Skalabrin, 1984; Matteson & O'Neil, 1989; Weinstein, Milgrom, Ratener, Read & Morrison, 1977), for nurses (Deets & Blume, 1977), and physicians (Caplan, 1971; Haynes, Davis, McKibbon & Tugwell, 1984; Lloyd & Abrahamson, 1979; McLaughlin & Donaldson, 1991).

Cervero (1985) noted that in spite of mounting evidence confirming the ability of CPE to produce improved performance, many educators and practitioners remain skeptical. He stated that the reason is that some programs produce behavior change and others do not. We need to determine why some programs successfully promote behavior change and how they differ from those that fail. Caplan (1973) suggested that "the evaluation measurement must be precisely appropriate to the intention of the learning experience" (p. 1151). Chambers (1977) offered a further refinement by suggesting that:

> Pre-test and post-test measures of change in continuing education are apt to be evaluations of the wrong thing .... Such scores have no place in attempts to regulate dentists in the name of serving the public. We have already found that change in behavior is not an overriding goal among attendees of continuing education and that it may be a very distorting indicator of the value of the course. (p. 42)

Bader (1987) expressed a concern that his review of effectiveness evaluation in CDE indicated that few studies have been performed and that "... the majority of available studies have employed weak evaluation designs" (p. 46). He advocated additional evaluation research, using stronger research designs, in order to accurately assess the effectiveness of CDE. He recommended further examination of how dentists learn and approach change as "... important antecedents to the design of effective CDE interventions (p. 46).

Chambers (1977) acknowledged that "part of the ethic of professionalism is remaining informed, which does not necessarily imply change" (p. 43). He stated that the emphasis should move from attempts to regulate CE attendance of professionals toward "... defining and requiring quality professional lifelong learning" (p. 43).

Cervero (1985) developed a framework linking CPE and behavior change and acknowledged borrowing several key components from the "adoption of innovations" literature. He suggested that the framework could be used in the analysis of "... why CPE programs are successful or unsuccessful in producing lasting changes in professionals' performance" (p. 88). This framework suggested that the following four sets of independent variables "explain variations in the extent of behavior change and ultimately, client outcomes" (p. 86):

- The characteristics of a CPE program;
- The characteristics of the professional;
- The change proposed and is usually defined by the goals and objectives of the CPE program; and
- The social system in which the professional will implement the behavior change.

Cervero (1985) acknowledged that "unless there are incentives or at least not disincentives within the working environment for the proposed changes, the CPE program is unlikely to be successful" (p. 87).

Dixon (1978) developed a "generalized model of causal chain of relationships between possible evaluation criteria of a continuing education course in the health professions" (p. 52). He suggested that the CPE course results in changes in the knowledge and attitudes of participants which in turn result in changes in clinical behaviors of participants which in turn change patient outcomes. The course and the three types of changes all affect the participants' perceptions of the course and its results.

Boissoneau (1980) cited the declaration of the National Advisory Commission on Health Manpower in the United States (1967), which declared:

> Professional societies and state governments should explore the possibility of periodic relicensure of physicians and other health professionals. Relicensure should be granted either upon certification of acceptable performance in continuing education programs or upon the basis of challenge examinations in the practitioner's specialty. (p. 5)

He claimed that the Secretary's Commission on Medical Malpractice (1973) made similar recommendations.

If the professionals and professions wish to maintain professional autonomy, Boissoneau (1980) suggested that they must establish meaningful and rigorous continuing education requirements for their members and must review membership requirements. Exclusionary membership requirements are not always in the best public interest. He cautioned health professionals to strive diligently to improve all aspects of their practice and to keep their knowledge up-to-date.

Although the effects of continuing education on practice remain controversial, there is an emerging agreement that Knox (1990) successfully identified the program elements that are necessary for continuing education programs to meet the changing needs of practitioners (Young & Rudney, 1991). Knox (1990) outlined the importance of involving practitioners in the identification of needs, of involving professionals in opportunities for practice and feedback and of effecting changes in practice/behavior based upon program theory and skills (Young & Rudney, 1991). The adoption of these program elements suggested that an evolution in continuing education is in progress. Bennett (1990) expanded the elements outlined by Knox by suggesting a greater shift in emphasis from the content being delivered to the health care professional encountering the content. She proposed that "... to make this shift, we must begin to account for effects of age and stage of development on learning and performance of health care professionals" (p. 174). Bennett and Fox (1993) suggested that we also need to improve our knowledge and understanding of how professionals learn because:

> professionals are complex and sophisticated learners. They have systems for incorporating new information into competence and performance .... Performance is adapted, modified, refined, or altered to meet new demands, incorporate new information, or react to improved ideas. (p. 268)

Conn (1992) suggested that because of the vast differences that exist between the good medical care that is provided by competent, knowledgeable and up-to-date physicians and the routine practices of those who have not made continuing professional education and improved practice a priority, both process assessment and outcome measurement will be necessary for evaluating the success of continuing medical education. Process assessment was described as the documentation of the hours devoted to continuing medical education. Outcome measurement was defined as the process used to determine whether the participant learned anything from the CME program or applied the knowledge in practice.

Program Development in CPE

Campbell (1991) suggested that educational programs for physicians must include social, economic, political and ethical aspects of patient care as these aspects frequently affect actual patient outcomes to a greater degree than technical interventions. He also recommended the addition of cohorts, considered to be associated with "art of medicine" (e.g., interpersonal relationships, communication and bioethics) into continuing medical education. He proposed the development of a core curriculum, by specialty, for continuing medical education. Conn (1992) described the greatest advances in undergraduate medical education during the 19th century as the movement of the process from the lecture room to the bedside. He stated that continuing medical education faced a similar need for change which could be achieved by moving from the seminar room to other locations (e.g., the laboratory for pathologists).

Felch (1991) described the need for a core curriculum which would serve as a framework, as a definition of the content of the specialty's board examinations and as a measuring stick to assess the competence and performance of individual professionals. He acknowledged the need for more aggressive measures in helping CME professionals utilize and master the informatics technology. Because some suboptimal practitioners can be helped by educational means, he suggested that remedial CME be considered. Felch (1991) encouraged CME professionals to place a greater emphasis on the individual's learning needs and educational planning. Finally, he suggested that subjects such as interpersonal relationships, communications and bioethics, which partially comprise the art of medicine, be introduced into CME. O'Neil (1986) concurred and suggested that "in continuing dental education today, a focus on clinical courses, while necessary, is no longer sufficient to address the tremendous range of forces which impinge upon the dental profession" (p. 14).

Frandson (1981) recommended the development of "... a comprehensive, balanced, in-depth, curriculum-oriented approach that facilitates the existing continuum in professional education and service" (p. 3). UCLA Extension has been in the process of designing and developing such a program over the past five years. The program is called Continuing Medical Education at UCLA: A Total Curriculum Approach. The curriculum is cyclical and it is designed to span a period of approximately three years. Physicians can enter the sequence at any point. New courses are added and existing ones are continually updated to reflect recent developments and research. Programs are developed based on physician need, patient care evaluations and level of practice. Frandson (1981) recommended a national plan for standardization of CME curricula that retains some ability to adjust for regional or local needs.

Rockhill (1981) suggested that:

> Continuing education for professionals should be developed as a matter of policy but as a voluntary, open learning policy. This would call for voluntary, decentralized learning experiences in a wide variety of settings, maximum learner control, a comprehensive approach to personal as well as professional learning needs, accessibility for all, applicability to individual situations, and participatory planning in designing learning experiences which are wanted and needed by intended recipients. (p. 68)

The increased number of professionals pursuing continuing education has resulted in increased continuing education programs. Overlapping courses and conflicting schedules have become a problem in the United States (Campbell, 1991). Dreier (1976) described the formation of consortia to coordinate the efforts of sponsors of continuing education programs and to improve *continuing* education in a six-state New England area.

Beagrie (1974) suggested that prior to the development and delivery of meaningful CDE programs, it was important to determine the most suitable methods of learning, the most appropriate organization to deliver the programs, the most accessible locations, the perceived areas of need, and the practice patterns of the attendees.

Escovitz and Davis (1990) agreed that the criticisms of CME focus on the lack of evidence linking educational programs to clinical behavior change, the deficiencies in clearly defining participants' needs, the use of didactic methods rather than active learner participation and the episodic nature of the process. They suggested, however, that substantial improvements in both the organization and delivery of CME have been made. They contended that major CME providers are "... far more likely to have careful needs assessments, educational planning, and evaluation" (p. 548).

Research conducted over the past two decades has "... begun to validate the efficacy of careful needs assessment, active learner participation and thorough program evaluation in effecting improvements in physician competence" (Escovitz & Davis, 1990, p. 548). It has also furthered the understanding that physicians change their clinical behaviors through an incremental process that involves inputs from CME programs, reading, collegial consultation, and some clinical trials. CME programs, by themselves, may not have an immediate impact on clinical behavior change but they may "... have an important role in providing the 'substrate' for other 'catalysts' to learning and clinical behavior changes by physicians" (Escovitz &

Davis, 1990, pp. 548 - 549). They suggested the adoption of a broader definition of CME that emphasized the physician learner, and the clinical and social environments in which learning occurs.

Boissoneau (1980) suggested that continuing professional education programs should be of an exceptional quality, provided at a reasonable cost, perceived to be worthwhile by participants, diverse in options of content and delivery, oriented toward outcomes or results, and easily accessible.

In 1991, Woolfolk, Lang, Farghaly, Ziemiecki and Faja researched the relative effectiveness of several continuing dental education (CDE) formats in transmitting information to dentists and the participants' perceptions of the efficacy of specific components of each format. Dental professionals appeared to select an appropriate education format based on their need for information. Those who chose a course presentation were the least knowledgeable and probably felt they would benefit from a formal presentation. Those who chose mailed written material and a videotape appeared to have a moderate need for information, and dentists who requested only written materials had the highest knowledge scores of all of the groups. A group of low knowledge practitioners who did not participate in any of the educational offerings was identified, raising the question of how these dentists could be stimulated to participate in CDE.

Stollings (1991) reported that during his involvement in designing and directing a 16 member practice improvement study group, sponsored by West Virginia University School of Dentistry, he had the opportunity "... to observe the learning patterns of established practitioners" (p. 12). He made several personal observations which he used to develop a "... starter list of ideas ..." (p. 14) for local societies involved in initiating management skill development programs. Many of his suggestions fell within the problem-based model approach to CPE, described by Belsheim (1986).

Brandt (1990) expanded the concept of continuing professional education to include both the informal and personal responsibilities of the professional as well as the formal offerings of professional societies, health professional schools and private sponsors. He acknowledged that the ultimate responsibility for continuing education rests with the health professional who must set aside study and reading time on a regular basis. This position was also supported by Fox (1991). Brandt (1990) suggested that it is the responsibility of the professional to spend the time and effort to research CE offerings to determine those that will be meaningful. He emphasized the important role that schools must play in stimulating students to pursue continual learning because without this motivation no CE system will ever be successful. To build upon this foundation, he challenged professional schools and societies to make a firm commitment to CE and to provide adequate resources for the development of quality CE programs. He cautioned that current systems must be changed so that faculty participation in the delivery of CE programs becomes a rewarding experience rather than a chore.

Kicklighter (1984) conducted an analysis of the literature on three components affecting CPE: the goals of CPE, the design of programs, and the outcomes of efforts. As a result of this analysis, Kirklighter made the following recommendations:

> 1. Problems that represent legitimate goals of continuing education should be differentiated from problems that can best be remedied in other ways ....
>
> 2. The extent of participation in continuing education, which is currently measured in clock hours and credits, should receive less

> emphasis. The effectiveness of learning activities not eligible for continuing education credit should be explored for continuing education efforts to be more individualized and more cost-effective.
>
> 3. More emphasis should be placed on continuing education in practice settings, since learning needs and the motivation for learning often arise from the practice of the profession ....
>
> 4. Rather than emphasizing measurements of competence and performance resulting from any single program or sequence of programs, an ongoing process for measuring competence and performance should be emphasized, such as various quality assurance programs.
>
> 5. Preservice curricula should be used to prepare students to become lifelong learners ....
>
> 6. To ensure the quality of continuing education programs, accreditation processes for institutions offering continuing education should include standards for continuing education effectiveness .... (pp. 176-177)

Bennett and Fox (1993) predicted that the future opportunities and dilemmas facing CPE professionals will be defined by the following five emerging themes:

> 1. Performance: The object of teaching and learning in CPE is performance, the actual behaviors of the professionals in practice.
>
> 2. Experience: A significant proportion of changing and enhancing professional performance is a function of learning embedded in the day-to-day experiences of professional practice.
>
> 3. Learning and change: Practicing professionals prefer learning as the agency of change; changes accomplished through learning are enduring and consistent.
>
> 4. Change agents: Planned and purposeful change in performance is the outcome expected from efforts of many actors in society, including those in CPE; continuing professional educators are agents of change.
>
> 5. Self-directed curricula: Although some changes accomplished through learning are a consequence of traditional CPE programs, most are a function of the professionals' own self-directed learning curricula. (pp. 262-263)

The Role of Needs Assessment in Program Development

Assessing learner needs was consistently identified in the literature on program planning as an integral step in program development (Bell, 1986; Betz, 1984; Kaufman, 1988; Lorig, 1977; Pennington, 1980). Beatty (1981) stated:

> The definition of need is the major determinant of both substance and strategy in the conduct of needs assessments in community. Such undertakings are based on the premise that needs do exist; that needs can be identified and diagnosed; and consequently, that needs are the legitimizers of social and educational services and programs. (p. 39)

Sork (1987) agreed that "... a method of justifying and focusing programming efforts is often required" (p. 127) but disagreed that needs assessment is an essential step in the design of effective continuing education programs. He cited the interest inventory, the market test, the compelling mandate, the trend and/or problem analysis and the intuitive programmer as examples of alternatives to needs assessment. Pennington (1980) agreed with Sork and cautioned that the realities of time, money and resources restrict continuing education practitioners in conducting comprehensive needs assessments for all new educational programs.

Beatty (1981), Bjorkquist & Murphy (1988), Kaufman (1988), Pennington (1980), Sork (1988) and Young & Rudney (1991) defined a "need" as a gap or difference between the current state of affairs and the desired state. A "needs assessment" was described as an activity during which these "gaps" are identified and analyzed. Knowles (1973) outlined the three sources of data for determining educational needs as the individual, the organization and society. The identification of educational needs through a comprehensive "needs assessment" may seem overwhelming but Popiel (1973) and Barbulesco (1980) advocated that the expressed interests or needs of the group or individual are essential to the development of educational programs that are to be perceived by the program participants to be related to their needs.

Barbulesco (1980) and Popiel (1973) also suggested that needs are constantly changing and therefore require periodical reassessment. This is a challenge for educators involved in continuing professional education. New technologies, techniques, skills, materials and knowledge are emerging at a faster rate than ever before. This also presents a challenge to professionals who are personally and professionally committed to maintaining a current, effective and safe level of practice. The resulting information gained through periodic needs assessments can be well utilized in the planning and development of effective continuing professional education offerings (Bell, 1986; Betz, 1984; Kaufman, 1988; Lorig, 1977; Pennington, 1980).

The learner was identified as an essential source of information by Beach (1982), Bell (1986), Lorig (1977), Mocker & Spear (1979), Pennington (1980) and Sork (1988). The literature included a variety of identified educational needs and while there did not appear to be agreement on the categories of need, most appeared to agree that there are a variety of important educational needs to be addressed during a needs assessment process (Barbulesco, 1980; Beach, 1982; Beatty, 1981; Bell, 1986; Knowles, 1977). Sork (1988) acknowledged professional associations, customers of professionals, professional regulatory bodies and professors as additional sources of important input.

There was considerable consensus that adults prefer to be involved in identifying and selecting learning experiences (Knowles, 1984; Langerman & Smith, 1979; Lorig, 1977; Mocker & Spear, 1979). Barbulesco (1980) suggested that, "... education programs must be perceived by the participants to be directly related to their needs" (p. 74).

Hertling and Greenburg's study (1974) of methods used to identify CPE needs and interests suggested that questionnaires and interviews may be the most effective methods. Woolf (1990) supported the use of questionnaires to determine perceived learning needs. Knox (1990) suggested that:

> Because participant involvement in program decision making contributes to both program effectiveness and subsequent self directed learning activity, planners should help learners contribute to such decision making. This occurs when participants complete a self assessment inventory, help build the agenda for a session, and use a learning agreement to guide a self-study project. (p. 270)

His position is supported by Cervero (1988), Houle (1980), Knowles (1980), O'Neil (1986), Schon (1987), and Stollings (1991). "Because encouraging participation is central to the success of continuing education planners, this topic (Influences on Participation in Continuing Education) deserves high priority for research and improvement of practice" (Knox, 1990, p. 272). According to Knox (1974) the need assessment process serves two purposes. One purpose is to provide the basis for program planning and the other purpose is to involve the individual professional in a personal self analysis which can be of assistance in setting personal educational priorities. Ross, Smith, Smith & Waldrep (1981) suggested limitations of program planning based on perceived needs because learners may be unaware of their real educational needs. However, due to fiscal and logistical constraints, needs assessments tend to focus on the identification of perceived need or preference (Ross et al, 1981).

If "the goal of most continuing education activities is to enhance professional proficiency" (Knox, 1990, p. 261), then effective continuing education programs and improved performance are more likely to occur when learners contribute to educational decision making regarding needs assessments and the application of new knowledge and/or skills (Atwood &

Ellis, 1971; Body, 1987; Boissoneau, 1980; Brandt, 1990; Cervero, 1988; Escovitz & Augsburger, 1991; Green, Kreuter, Deeds, & Partridge, 1980; Houle, 1980; Jennett & Laxdal, 1984; Knox, 1990; Knowles, 1980; Lorig, 1977; Nakamoto & Verner, 1972; O'Neil, 1986; Schon, 1987; Williamson, 1978). Williamson (1978) suggested that learning needs can be determined through the use of written and oral opinions, open or closed-ended questionnaires, results of self-assessment tests, performance studies performed in work settings, regional health statistics, and from feedback provided on program evaluations. By using a combination of approaches, "... the decision that a need exists can be supported on a sounder basis" (Williamson, 1978, p. 149).

Swanson and Jennett (1992) conducted a study of the value of formal needs assessment criteria in determining the educational needs of practicing family physicians relating to diagnostic and therapeutic issues in hypertension. Although the study was small and limited to two CME presentations on hypertension, they planned and redesigned a second presentation on the basis of a formal needs assessment which, in their opinion, was more successful in meeting the educational needs of the participants. Lorig (1977) cautioned that involving potential learners in the determination of perceived educational needs commits the educator to consider their needs carefully.

Williams and Butters (1991) acknowledged that course offerings have frequently been based on the perceived needs of dental professionals but suggested the use of population-specific needs as an effective basis for planning continuing education programs.

Escovitz and Augsburger (1991) randomly surveyed representatives of five health care professions in Ohio to determine their past experiences with continuing education and their perceived future needs. Most of the respondents favored conferences and seminars, but pharmacists indicated a strong interest in home-study courses. The majority preferred one day programs, preferably Wednesday or Saturday. The months of March, April and October were the preferred months for continuing education courses and suburban sites represented the preferred location. The important factors influencing program participation included program content, date, time and location. The study found limited interest in interdisciplinary programs and a strong preference for profession-specific activities. The researchers concluded that in spite of the findings, they planned to pursue the development of interdisciplinary programs that would be carefully evaluated in light of the study findings.

Young and Rudney (1991) conducted a continuing education needs assessment of dentists in a six-state region in the United States. The lecture format was preferred over either participation or demonstration formats. Preferred topic areas included geriatric dentistry, endodontics and restorative dentistry. Respondents preferred to attend one day programs, held on Friday or Saturday, during the fall or winter. The responding dentists averaged over 50 hours of CDE per year and those with high hours tended to obtain credits from all types of program sponsors.

Porter (1988) reported on a survey of Houston-area dentists to assess their needs and interests. Of the responding dentists, 89% were in general practice, with the majority of those being solo practitioners. The respondents used professional journals, CE courses and books as their most frequent choices in an effort to remain current. Dental schools were selected as the preferred location of CE courses, with the local dental society programs and state dental meetings being chosen as the second and third option. Courses in restorative dentistry, periodontics and practice management were indicated to be of highest need. Other topics of great interest included oral diagnosis, TMJ dysfunction, implants and geriatric dentistry. The majority of the respondents indicated a preference for one-day courses and Friday was the most requested day, followed by Saturday and Wednesday. Of those surveyed, 81% preferred lecture/demonstration formats; the second choice was clinical participation courses. Suggestions for improvement included a recurring request that clinicians make their courses practical.

Bhat and Cohen (1987) studied the perceived continuing education needs of Ohio dentists. The dental schools and sponsored specialty societies were the first and second choice for sponsorship of CE courses. The ideal length of didactic courses was one day and of hands-on courses was two days. The preferred months for continuing education courses were the winter months of January and February. The most preferred subject areas were restorative and prosthetic dentistry, periodontics, orthodontics, bonding techniques and practice management. The response rate (26.7%) was low but no follow-up was attempted.

Young (1985) randomly selected 320 dentists from a population of 2,842 licensed practitioners to study the perceived needs of dentists practicing in the state of Minnesota in 1983. The majority of respondents (63 percent) preferred one day programs and the most convenient days were Friday or Saturday. The preferred months were January through April. Nearly half of the dentists indicated a preference for programs held at dental schools. Five of the top ten content areas of interest related to occlusion and periodontics. The most frequently requested participation programs included oral surgery, occlusion and endodontics and the less experienced dentists expressed a higher interest in participation programs than their experienced peers. It was felt that this research project provided valuable information to program planners so that they could better meet the needs of the dental community.

Block, Grantham, Leist and Yokeley (1982) determined the continuing education needs for dentists and auxiliaries by a mailed questionnaire, in the northeast region of North Carolina. There was general agreement among dentists, hygienists and assistants about the need for regional continuing education. The preferred length for programs was one day, preferably Friday or Saturday. All age groups of dentists agreed that the top two topics of choice were current concepts in operative dentistry and office emergencies. There was no overall agreement on the ranking of other topics and there was no pattern of variation. There were differences of opinion between dentists and auxiliaries with respect to the content areas of continuing education need for auxiliaries. According to the researchers, this study provided continuing education planners with very helpful information which they have utilized in planning regional continuing education.

A continuing education needs assessment for dentistry was sent to all members of the dental association in South Carolina by Ross, Smith, Smith and Waldrep in 1981. Most of the respondents (90 percent) indicated their need for continuing dental education as moderate. The most preferred subject areas were management of office emergencies, basic life-saving techniques, practice management and occlusion-related problems. It was interesting to note that the specialists, as a group, reported lower need levels than general practitioners and dentists with less than five years experience consistently reported a higher need level. The researchers felt that this research project catalyzed the dialogue between program planners and potential participants and provided valuable findings that will be utilized in the program planning process.

Participation in CPE

Craft, Richards and Reed (1992) examined the program characteristics influencing nurse selection of continuing education offerings. While all of the characteristics were of some importance to respondents, the four most important were to gain professional knowledge on a topic, to meet licensure requirements, to learn content related to current practice and to learn career related content.

Karp (1992a, b & c) sent a questionnaire to a random sample of physical therapists in Georgia. The purpose of the study was to gather information regarding perceived barriers and preferences prior to developing continuing education programs. The respondents preferred lecture and seminars or workshops as methods of instructional delivery and preferred to attend sessions offered in the autumn or winter. They voiced a strong need for information on orthopedic physical therapy. Barriers to CE attendance included cost, travel over 150 miles, loss of time with family, previous experience with programs, lack of information regarding available courses and the lack of pertinent programs. Factors that motivated respondents to attend CE offerings included furthering their knowledge, complying with CE requirements for relicensure and increasing opportunities for advancement in their present position. She proposed "A Framework for the Development of a Physical Therapy Continuing Education Program" (Karp, 1992c, p. 244). The model facilitated the evaluation of the complete program but, unlike Cervero's framework (1985), there was no obvious link to behavioral change or client outcomes.

Scanlon and Darkenwald (1984) surveyed a population of allied health professionals to identify deterrents to participation in CPE activities. The following six factors were identified: disengagement or alienation, the quality of the program, family responsibilities, work constraints, a perceived lack of benefit, and cost.

In a study completed by Konrad, Elliott, McNeal and Sonoda (1982), over 40 percent of all Further Education Council Coordinators selected five barriers that made their participation in professional development difficult. The most frequently identified barriers included courses offered at the wrong location, not enough time, home responsibilities, job responsibilities, and courses offered at the wrong time. Home responsibilities ranked highest as a barrier for female coordinators in their thirties and cost was ranked second by coordinators under 30 years. The researchers determined that a combination of factors, varying to some degree with the characteristics of the coordinator, were responsible for inhibiting participation in professional development opportunities.

Boissoneau (1980), Cervero (1981), Houle (1980), Mazmanian and Mazmanian (1981), Milgrom (1978), Nakamoto & Verner (1972), Porter (1990) and Vilensky-Sanders and Sanders (1989) outlined the reasons why physicians and dentists participated in continuing educational offerings. They included keeping abreast of new skills, concepts and developments, validating or modifying prior learning or behavior, interacting with colleagues, changing the pace from practice, maintaining and improving their professional competence and service to their patients, enhancing their personal and professional position, rekindling enthusiasm, fulfilling re-licensure requirements and understanding oneself as a professional. Cervero (1988) outlined five important reasons why professionals participated in CE, as cited by Grotelueschen (1985). They included professional improvement and development, professional service, collegial learning and interaction, professional commitment and reflection, personal benefits, and job security.

A questionnaire on continuing education was distributed to all Alberta and Atlantic province dentists in 1989 by Patterson and Thompson, with the assistance of Cunningham. Respondents felt that CDE was very important and that it was one effective way in which the profession and its members could maintain competence and reach for excellence. Dentists from Alberta, where continuing education is mandatory, attended three times as many days of CDE as their Atlantic peers, where continuing education is optional. The Atlantic province dentists preferred to attend CDE courses in October and November and their Alberta counterparts preferred February. Both groups preferred to attend courses on Friday and Saturday. The lecture format was one and one-half times more popular than the participation format and the three most significant factors in the selection of courses were the course content, course speaker and course location.

Summary

This chapter presented a review of the literature relating to the continuing education needs of health care professionals. The review of the literature revealed that there is a lack of consensus regarding the role of professions in society, the relationship of continuing education to competence and performance in health care professionals, the purposes of continuing professional education, the focus and content of continuing professional education programs and appropriate providers of continuing professional education.

The review revealed both a great deal of emerging interest and confusion in the field of continuing professional education which has been viewed as a way of dealing with the rapid increase in new knowledge, technology and social change, and the perceived increased need for public accountability.

The literature described various models of continuing professional education but there seemed to be consensus that the Update model (with its stated flaws) still accurately reflects the current field of continuing education for health care professionals. Some of the described models of CPE were more comprehensive than others and some dealt with the issue of evaluation while others did not.

The literature showed a strong commitment to understanding the professionals' learning needs and to incorporating these perceived needs into the development of continuing education programs. This commitment included understanding and reducing barriers to participation, determining preferred learning methodologies and identifying preferred times and locations.

CHAPTER III

RESEARCH METHODOLOGY

The research methodology that was used in this study was designed to gain a comprehensive understanding of the perceived continuing education needs of Alberta dentists. This section outlines the methodology that was used to conduct the study. First, the general design of the study is outlined, followed by a description of the research instrument. The methods of data collection, ethical considerations, the population and sample and the timeline are reviewed. Lastly, methods of data analysis are addressed.

The Survey Method

The purpose of the study was to determine the perceived continuing education needs of Alberta dentists. The findings will be shared with the ADA and the Faculty of Dentistry, UofA, and may ultimately be used by professionals involved in planning, developing, and implementing CDE programs. Because this study was undertaken with the view to applying the findings, it was classified as applied research (Borg & Gall, 1989).

A descriptive survey method was utilized for the general design of this study. This approach was chosen because of the nature of the research problem and its emphasis on the subjects of the study, i.e., learning needs as perceived by the dentists of Alberta. Bhat & Cohen (1987), Block et al. (1982), Escovitz & Augsburger (1991), McKay (1979), Patterson & Thompson (1990), Ross et al. (1981), Young (1981), and Young & Rudney (1991) recommended the use of the survey method for determining learning needs in adult education. The number of individuals in the sample, financial resources, and the time constraints of this study were also factors considered in determining the method of data collection.

It was recognized by the researcher that research tools such as surveys are subject to the influences of uncontrollable variables. Careful attention was given to the question of validity which can be a serious limitation to survey research if not adequately addressed (Ary, Jacobs & Razavieh, 1990).

The Research Instrument

The questionnaire was designed for the purpose of this study and was developed by using items from other questionnaires and by ideas generated through a review of other questionnaires (Dalhousie University, nd; University of Alberta & Dalhousie University, nd; and Konrad et al., 1982). The questionnaire (see Appendix A) was eight pages in length and consisted of three parts: Current Learning Needs, Learning Preferences, and Demographics and Current Practice Patterns. The researcher sought to obtain both quantitative and qualitative data which resulted in a combination of closed and open-ended questions. The majority of the questions employed a five-point Likert scale, ranging from 1 (no need) to 5 (high need). The open-ended questions provided the opportunity for unstructured comments or suggestions which resulted in information not otherwise available through the use of closed-ended questions.

Part I of the questionnaire provided detailed information regarding the respondents' reasons for choosing CE and their perceived professional development needs.

Part II of the questionnaire provided information regarding the respondents' perceptions of effective educational methods, barriers to their pursuit of CE, their preferred forms of CE, level of interest in CE, preferred locations for CE, and their preference by day of the week for CE.

Part III of the questionnaire provided general background information about the respondents. Questions were asked regarding their type of practice, nature of practice, gender, year of graduation, and the location of their practice. This section included an open-ended question that asked the respondents to offer comments or suggestions for the improvement of CE offerings to dental professionals in Alberta.

Pilot Testing

The questionnaire was pilot tested, prior to its use, with six dentists from British Columbia. A covering letter (see Appendix C) and the questionnaire were mailed to these individuals in order to improve the questionnaire's quality and to establish its content validity.

The validity of the instrument was enhanced by asking the respondents to indicate their interest in CDE and by assuring them, in the covering letter, that their participation was both anonymous and voluntary. The covering letter discussed the purpose of the study, the expected return date and the availability of the results.

All six of the distributed questionnaires were returned. The feedback obtained through pilot testing was of an editorial nature and helped in the development of the final draft of the questionnaire. It was eight pages in length, contained 16 questions, and had a total of 143 response items (see Appendix A).

Data Collection

The process of data collection was influenced by the ethical considerations, population and sampling procedures, and questionnaire distribution.

Ethical Considerations

Ethical approval of this study was obtained from the UofA, Department of Adult, Career and Technology Education. Permission to access the population of the ADA was obtained from the ADA Executive Director, Dr. B. Martinello. Initial support for this study was obtained from Dr. G. Thompson and Dr. S. Patterson from the Faculty of Dentistry, UofA and from Dr. B. Martinello, Executive Director, ADA.

All subjects received a covering letter stating the purpose of the study and assuring voluntary and anonymous participation (see Appendix C). A joint letter from the President of the ADA, and Dr. S. Patterson, Director of Continuing Education, Faculty of Dentistry, UofA, requesting their participation and outlining the importance of the results, was included in each package (see Appendix C). The questionnaire was identified by number and the analysis was concerned with aggregate data rather than individual responses. Participation in this study was on a voluntary basis and the researcher did not perceive that the study was threatening to participants.

The Population and Sample

The population for the study included all 1427 licensed dentists in Alberta. There were 156 specialists, representing seven specialties, included in the total number of licensed dentists. Because the number of specialists, in total, and the number of specialists within each specialty was both variable and small, a random sample of 300 licensed dentists was selected (Bhat & Cohen, 1987; Block, Grantham, Leist & Yokeley, 1982; Escovitz & Augsburger, 1991; Ross, Smith, Smith & Waldrep, 1981; Young, 1985) from a current membership list obtained from the ADA. The starting point on the list was determined through the random selection of a number from 1 to 5. Every fifth name was chosen from the starting point to the end of the list. Additional names, to reach the number required, were generated by choosing the second name in the intervals of five.

Generalizations of the findings to all Alberta dentists was carried out with caution because non respondents may have answered in ways that were markedly different from the responding group. The findings may be more representative of Alberta dentists who expressed an interest in CDE.

Collection of Data

A total of 300 questionnaires were mailed to Alberta dentists. Each individual was sent a package containing two covering letters, a questionnaire and a stamped, addressed envelope to return the questionnaire to the researcher. The distribution and collection of the questionnaires occurred during June, July and August of 1993. In order to attain the highest response rate possible, the June 30, 1993 deadline was extended until August 1993. Each return envelope was number coded to aid in planned follow-up procedures to increase the response rate.

The reference list was carefully compiled and filed and was never referred to because a second mailing was not required. The list was destroyed once the data were received and reviewed, ensuring the confidentiality of the respondents. The respondents were given numbers from 001 to 300 prior to the mailing of the questionnaire. Some respondents destroyed the number on their envelopes; in these instances, the respondents were given numbers of 301 and greater. The packages were prepared and mailed by the researcher and by her research assistant. The researcher obtained address labels from the Alberta Dental Association (ADA), and the mailing and supply costs were covered by the Faculty of Dentistry, University of Alberta (UofA), and the ADA.

Timeline

A timeline is included which outlines the schedule that was followed for this research study (see Appendix B).

Returns

A total of 185 of the 300 distributed questionnaires were returned as outlined in Table 3.1. Of these 185 questionnaires, 180 were usable for data analysis, a response rate of 60%. The unusable questionnaires had very few responses or had comments attached outlining immediate plans for retirement. The response rate was considered acceptable for this study.

Table 3.1: Questionnaires Distributed and Returned

Questionnaire	Total	Percentage
Useable	180	60.0
Unuseable	5	1.7
Not returned	115	38.3
	300	100.0

Data Analysis

Organization of Data

Each questionnaire item was coded for statistical analysis. The questionnaires were analyzed using the Statistical Package for the Social Sciences (SPSSx). This comprehensive computer program was utilized to manage, analyze and display the data (Borg & Gall, 1989). The research data were keyboarded into a computer. SPSSx was then used to generate a printout of the data file and the frequency distribution of scores by variable. Both the data file and frequency distribution for the data entries were checked for errors. The data were re-entered and the two sets of data were compared. Variations were checked and corrections were made. This ensured the integrity of the data. This was a crucial step as data entry errors render the subsequent statistical analysis useless.

Once the data had been entered and checked, SPSSx was used to create a system file for data analysis. Commands such as DESCRIPTIVE, used to determine frequencies, means and standard deviations, and ANOVA, used for variance analysis, communicated requests for analysis to the SPSSx programs. A printout of the data file, the command file, the listing file and the results were obtained. The analysis results, presented in the form of a computer printout, showed the code numbers and corresponding variables (Borg & Gall, 1989). Borg and Gall (1989) recommended working in partnership with a data analyst because the researcher had a better understanding of the data collected and of the methodology. All raw data were labeled, filed and retained in case the data needed to be verified, reanalysed or used in future research projects. The data and subsequent data analysis were organized and grouped according to the four research questions.

Analysis of Data

This descriptive survey yielded both quantitative and qualitative data. The quantitative data which were obtained regarding demographic information and perceived continuing education needs were nominal and interval in nature. Qualitative data were obtained from open-ended responses.

Quantitative data were analyzed using descriptive and inferential statistics. The statistical analysis involved two phases. The first phase included the analysis of the data in order to provide a summary description of answers to the four research questions. The mean and standard deviation were used to indicate the average score and the variability scores for the sample (Borg & Gall, 1989). The mean, according to Borg and Gall (1989), is considered to be the best measure of central tendency. The standard deviation was used to report the extent to which the scores in a distribution deviated from their mean (Borg & Gall, 1989).

The second phase included the analysis of the data through the use of inferential statistics to determine relationships among respondents' perceived CE needs, their preferred learning activities and their current practice patterns and demographic characteristics. The data were summarized and described by frequency, rank order and percentage distribution. Measures of central tendency and variability were utilized. Additional findings were determined through data analysis using t-tests and F-tests. The qualitative data obtained from the open-ended questions were analyzed according to the frequency of responses and to emerging themes.

Summary

The purpose of this study was to determine the perceived continuing education needs of Alberta dentists. The findings will be shared with the ADA and the Faculty of Dentistry, UofA, and may be used by those involved in the planning, development, and implementation of future CDE offerings. A descriptive survey method was utilized and a questionnaire was employed to obtain the data for the study. A sample of 300 licensed dentists was surveyed and the response rate was 60 percent or 180 responses. The data were organized according to the four research questions of this study. Descriptive and inferential statistics were utilized to analyze the data. Throughout this study, appropriate ethical guidelines were followed.

CHAPTER IV

PRESENTATION AND DISCUSSION OF DATA ANALYSIS

The purpose of this study was to identify the perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics of Alberta dentists and to identify relationships among them. Answers to the following research questions were sought:

1. What are the perceived continuing education needs of Alberta dentists?
2. What are their preferred learning activities?
3. What are their current practice patterns and demographic characteristics?
4. What relationships exist among their perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics?

A descriptive survey method was chosen and a questionnaire was utilized as the data collection tool. A random sample of 300 Alberta dentists was surveyed and 180 usable questionnaires were returned for a response rate of 60% percent. Not all of the respondents completed the questionnaire in its entirety. Five of the returned questionnaires were removed prior to analysis because they were largely incomplete. The analysis of the data was predominantly done through the use of descriptive statistics. Some of the data were analyzed by inferential statistics and others according to the frequency of responses and emerging themes.

This chapter presents the results of the data analysis along with a discussion and summary of the findings. It begins with a description of the respondents' perceived continuing education needs. The results of the data analysis are presented and discussed with respect to the four research questions. Lastly, additional findings are reviewed.

Perceived Learning Needs

In this section, the data analysis are reported and discussed regarding the perceived learning needs of Alberta dentists. Frequency and percentage distributions were tallied and means and standard deviations (SD) were calculated for each variable.

In Part I, question 1, the respondents rated how important continuing education was for a variety of purposes. Respondents rated the purpose on a five-point Likert scale which ranged from "no need" to "high need" for each of seven aspects of their professional development. Table 4.1 presents these data in rank order by mean scores of the level of need identified by respondents.

Table 4.1: Purposes of Continuing Education

Rank	Purposes	Mean	SD
1	Keeping abreast of advances	4.4	.70
2	Acquire new knowledge	4.4	.71
3	Update knowledge	4.2	.79
4	Understand technical advances	4.2	.83
5	Acquire new skills	4.0	.85
6	Update skills	3.8	.92
7	Reinforce that you are doing things correctly	3.7	.99

Continuing education was perceived by Alberta dentists to be important in keeping abreast of advances, acquiring new knowledge, updating knowledge, understanding technical advances, acquiring new skills, updating skills, and reinforcing that they are doing things correctly. Of these seven purposes, keeping abreast of advances and acquiring new knowledge were the two highest ranked purposes as reported by mean scores for pursuing CE. Although updating skills and reinforcing that you are doing things correctly were indicated as reasons for pursuing CE, the data analysis indicated that they were perceived to be the least important of the seven purposes. The standard deviation shows that there was a much lower level of consensus for these two purposes than for the top two purposes.

In Part I, question 2, the respondents were asked if they had experienced a need for information or skills that could not be met within the past year. Table 4.2 presents their responses to this question. Most of the respondents (79.2%) had not experienced a need for information or skills that was unmet within the past year.

Table 4.2: Unmet Need for Information/Skills
(N=178)

Answer	Frequency	Percent
No	141	79.2
Yes	37	20.8
	178	100.0

M=1.792 SD=.41

Those respondents who experienced a need that was unmet during the past year were asked to identify a learning need for which assistance seemed unavailable. Of the 37 respondents who indicated an unmet need, 33 respondents provided 42 examples. These needs are summarized according to frequency of response and emerging themes in Table 4.3. The highest levels of unmet learning needs were in the areas of implantology techniques, dental materials, periodontics and orthodontics. A large variety of other needs were mentioned by one or two people (see Appendix D).

Table 4.3: Themes: Unmet Learning Needs
(N=33)

Themes	Frequency	Percent
Implantology techniques	8	19.0
Dental materials	6	14.3
Periodontics	3	7.1
Orthodontics	3	7.1
Other	22	52.4
	42	99.9

In Part I, question 3, respondents were asked to identify their anticipated learning needs over the next five years. A five-point Likert scale (eg, "no need," "very low need," "low need," "moderate need" or " high need") was used. The mean scores were ranked from the highest to the lowest need; Table 4. 4 presents the categories of perceived need.

Table 4.4: Categories of Perceived Learning Needs of Total Sample

Degree of Need	Mean Score Range	Number in Category	Range
High	4.5-5.0	0	
Moderate	3.5-4.4	41	1-41
Low	2.5-3.4	39	42-80
Very Low	1.5-2.4	4	81-84
Nil	Below 1.5	0	

No perceived learning needs received the ranking of "high" need. It is possible that the high CE needs of Alberta dentists are being met by the courses currently offered by a variety of sponsors. In retrospect, however, it is also possible that the rating scale that was chosen inadvertently emphasized the "no" to "low" need categories by providing three possible choices while the areas of moderate and high need were limited to two responses. Possibly a five-point Likert scale that ranged from "no need," "low need," "moderate," "high," to "very high" need would have resulted in more "balanced" results.

Mean scores were used to determine the degree of need for 84 learning needs; the higher the mean, the greater was the perceived need (see Table 4.5). These 84 learning needs were further categorized into 15 subject areas in the questionnaire. There were no learning needs of perceived "high" need by responding Alberta dentists. Forty-one of the learning needs were ranked as "moderate" need. The learning needs which had the highest mean score (4.0) were dental materials used in esthetic dentistry, dental materials in general and restorative materials used in operative dentistry. Of the thirteen learning needs that had a mean score of between 3.8 and 4.0, the majority were related to materials and techniques used in esthetic, operative, periodontic and endodontic dentistry. Fourteen learning needs had a mean score of between 3.6 and 3.7 and the majority of these needs related to diagnosis, treatment planning, materials and devices in fixed prosthodontics, dental emergencies, anaesthesia/pain control and cardiopulmonary resuscitation in the "other" subject area, total quality management, practice development and risk management in practice management and posterior composites and bleaching in esthetic dentistry. Fourteen additional needs had a mean score of 3.5 and half of these learning needs related to office management, career stress, financial management, and communication in practice management and interceptive therapy, space management, and diagnosis in orthodontics.

Table 4.5: Perceived "Moderate" Learning Needs of Total Sample

Subject Areas	Learning Needs	Mean	SD
Esthetics	Materials	4.0	1.14
Basic science	Dental materials	4.0	1.01
Operative	Restorative materials	4.0	1.01
Operative	Tooth colored restoration	3.9	1.04
Esthetics	Bonding	3.8	1.20
Periodontics	Diagnosis & treatment plan.	3.8	1.02
Periodontics	Non-surgical treatment	3.8	1.05
Fixed prosthodontics	Techniques	3.8	1.10
Endodontics	Techniques	3.8	1.10
Occlusion	TMJ dysfunction	3.8	.99
Endodontics	Materials & devices	3.8	1.13
Esthetics	Veneers	3.8	1.15
Other	Medical emergencies	3.8	1.04
Other	Dental emergencies	3.7	1.04
Fixed prosthodontics	Materials & devices	3.7	1.15
Fixed prosthodontics	Diagnosis & treatment plan.	3.7	1.09
Other	Anesthesia/pain control	3.7	1.11
Esthetics	Posterior composites	3.7	1.18

Other	CPR	3.7	1.19
Esthetics	Bleaching	3.7	1.10
Periodontics	Soft tissue surgery	3.6	1.15
Basic science	Pharmacology	3.6	.95
Oral diagnosis	Oral medicine	3.6	1.03
Practice mgmt.	Total quality management	3.6	1.14
Practice mgmt.	Practice development	3.6	1.13
Occlusion	Appliances	3.6	1.10
Practice mgmt.	Risk management	3.6	1.15
Other	Medically compromised patients	3.5	1.01
Orthodontics	Interceptive therapy	3.5	1.25
Endodontics	Diagnosis & treatment plan.	3.5	1.09
Removable prosthodontics	New techniques & materials	3.5	1.16
Esthetics	Porcelain inlay/onlay	3.5	1.21
Practice mgmt.	Office management	3.5	1.14
Practice mgmt.	Career stress	3.5	1.24
Practice mgmt.	Financial management	3.5	1.17
Fixed prosthodontics	Implants	3.5	1.26
Occlusion	Oral rehabilitation	3.5	1.11
Orthodontics	Space management	3.5	1.18
Oral diagnosis	Radiology	3.5	1.01
Practice mgmt.	Communication	3.5	1.18
Orthodontics	Diagnosis	3.5	1.17

Thirty-nine of the learning needs were ranked as "low" need (see Table 4.6). A variety of needs (11) had a mean score of 3.4. No specific subject areas reoccurred as learning needs in this group. Thirteen additional needs had a mean score of between 3.1 and 3.3. The majority of these perceived "low" needs related to complete dentures and removable dentures in removable prosthodontics, prevention, consumer products, and electrosurgery in the "other" subject area, implants, and third molar extractions in oral surgery and functional therapy, and corrective therapy in orthodontics. A variety of learning needs (15) had a mean score of between 2.6 and 3.0. The majority of these needs related to treatment for handicapped people, sedation, oral photography, social problems, substance abuse, and forensics in the "other" subject area, bacteriology, nutrition, and physiology in the basic sciences, prevention and patient management in pedodontics and prevention, treatment and education in public health.

Table 4.6: Perceived "Low" Learning Needs of Total Sample

Subject Areas	Learning Needs	Mean	SD
Basic sciences	Oral pathology	3.4	.97
Other	Preparation for retirement	3.4	1.25
Practice mgmt.	Computers	3.4	1.15
Oral diagnosis	Physical evaluation	3.4	.99
Removable prosthodontics	Precision attachments	3.4	1.16
Periodontics	Curettage & scaling	3.4	1.10
Oral surgery	Post-operative complications	3.4	1.11
Periodontics	Osseous surgery	3.4	1.22
Other	Geriatrics	3.4	1.18
Orthodontics	Appliances	3.4	1.22
Occlusion	Equilibration	3.4	1.06
Periodontics	Splinting	3.3	1.09
Practice mgmt.	Auxiliary utilization	3.3	1.14
Removable prosthodontics	Removable dentures	3.3	1.18
Operative	Inlay/inlay	3.3	1.15
Other	Prevention	3.3	1.09
Oral surgery	Implants	3.3	1.28
Oral surgery	Third molars	3.2	1.19
Other	Consumer products	3.1	1.00
Orthodontics	Corrective therapy	3.1	1.22
Orthodontics	Functional therapy	3.1	1.23
Other	Electrosurgery	3.1	1.13
Removable prosthodontics	Complete dentures	3.1	1.22
Pedodontics	Pulpal therapy	3.1	1.14
Other	Treatment for handicapped	3.0	1.10
Pedodontics	Prevention	3.0	1.18
Other	Sedation	3.0	1.16
Other	Oral photography	3.0	1.14
Basic sciences	Bacteriology	3.0	1.00
Pedodontics	Patient management	3.0	1.20
Oral surgery	Exodontia	3.0	1.16
Basic sciences	Nutrition	3.0	1.02

Public health	Prevention	2.9	1.12
Public health	Treatment	2.9	1.08
Public health	Education	2.9	1.08
Operative	Pins	2.8	1.07
Other	Social problems	2.8	1.05
Basic sciences	Physiology	2.8	.87
Other	Substance abuse	2.6	1.12

Four of the learning needs were ranked in the "very low" category (see Table 4.7). These needs were from four distinctly different subject areas. No learning needs were ranked in the "no need" category.

Table 4.7: Perceived "Very Low" Learning Needs of Total Sample

Subject Areas	Learning Needs	Mean	SD
Basic sciences	Basic anatomy	2.4	.90
Other	Forensics	2.4	1.12
Orthodontics	Surgical orthodontics	2.4	1.18
Oral surgery	Orthognathic surgery	2.2	1.06

There was a relatively high consensus of the responses in six of the 84 learning needs. In the remaining 78 needs the respondents did not answer with as much consensus. It is possible that the reduced consensus was reflective of a diverse group or a group with diverse needs or both.

Respondents had the opportunity to make other suggestions regarding learning needs. Eight individuals offered eleven different suggestions; no themes emerged in their responses (see Appendix E).

Preferred Learning Activities

In this section, the data are reported and discussed regarding the preferred learning activities of Alberta dentists. In Part II, question 1, the respondents rated the effectiveness of a variety of educational methods in facilitating their learning. Respondents rated the effectiveness on a five-point Likert scale which ranged from "not effective" to "highly effective" for each of seven educational methods. Table 4.8 presents a summary of the perceived effectiveness of seven educational methodologies by rank order and mean score.

Table 4.8: Perceived Effectiveness of Dentists' Preferred Educational Methodologies

Rank	Educational Methodology	Mean	SD
1	Hands on practice	4.5	.69
2	Workshops	3.9	.89
3	Lectures	3.9	.81
4	Question & answer sessions	3.4	.97
5	Group discussions	3.3	1.03
6	Self instruction	3.3	1.11
7	Panel discussions	3.1	.99

Hands on practice was perceived to be the most effective educational methodology for facilitating the learning of responding Alberta dentists, with a relatively high consensus of response. There was a moderate range of deviation in the responses from .69 to 1.11. Workshops and lectures were also perceived to be effective educational methodologies and the consensus of response was relatively high. While panel discussions were perceived to be moderately effective, they were determined to be the least effective of the seven educational methodologies in facilitating learning. Once again, there was a relatively high consenus of response. These findings suggested that responding Alberta dentists found the most effective educational methodology for facilitating their learning to be hands on practice where they had the opportunity not only to assimilate new knowledge but to practice it in a clinical setting. It would be reasonable to assume that the preferred methodology would also be related to the content encountered by the learner.

In Part II, question 2, respondents indicated whether they would attend an educational program of interest that utilized the lecture method, small group discussions, workshops or hands on practice. Respondents rated their probability of attending on a five-point Likert scale, ranging from "no" to "definitely" for each of four educational methodologies. Table 4.9 presents a summary of the willingness to attend CE sessions that use various educational methodologies by rank order and mean score.

Table 4.9: Willingness to Attend CE Sessions That Use Various Educational Methodologies
(N=176)

Rank	Educational Methodology	Mean	SD
1	Lecture	4.2	.83
2	Hands on practice	4.2	.90
3	Workshop	3.7	1.09
4	Group discussion	3.4	1.06

Responding Alberta dentists indicated that they were "very likely" to attend sessions of interest to them that utilized a lecture, hands on practice or workshop methodology. There was a probability, however, that they would attend sessions of interest to them that utilized any one of the four educational methodologies, but there was less consensus of response for workshops and group discussions. It is interesting to note that although responding Alberta dentists perceived hands on practice to be the most effective educational methodology followed by workshops and lectures (see Table 4.8), they indicated that they would "very likely" attend sessions that utilized a lecture, hands on practice, or a workshop methodology.

In Part II, question 3, respondents indicated barriers to their pursuit of CE on a five-point Likert scale, ranging from "no" to "definitely" for each of nine possible barriers. Table 4.10 presents these data, by the perceived degree of the barrier, in rank order by mean score.

Table 4.10: Perceived Barriers to the Pursuit of CE
(N=174)

Rank	Perceived Barriers	Mean	SD
1	Course not relevant to needs	3.7	1.34
2	Inconvenient time	3.6	1.27
3	Inconvenient location	3.5	1.33
4	Time constraints	3.4	1.31
5	Credibility of sponsor	3.3	1.28
6	Family responsibilities	2.9	1.37
7	Overhead costs	2.9	1.48
8	Course cost	2.7	1.26
9	Insufficient information re: course	2.7	1.14

The items found to be "very likely" barriers to the pursuit of CE included the following: the course is not relevant to their needs, inconvenient time, and inconvenient location. Time constraints, the credibility of the sponsor, family responsibilities, overhead costs, course cost, and insufficient information regarding the course were indicated as "probable" barriers to the pursuit of CE.

Respondents were provided with the opportunity to make other suggestions regarding barriers to the pursuit of CE. Ten individuals offered suggestions but no themes emerged in their responses.

In Part II, question 4, the respondents rated the extent to which they preferred a variety of forms of CE. Respondents rated their preference on a five-point Likert scale which ranged from "dislike" to "high preference" for each of nine forms of CE. Table 4.11 presents these data in rank order by mean score from high to low preference forms of CE.

Table 4.11: Dentists' Preference for Various Forms of CE
(N=172)

Rank	Forms of CE	Mean	SD
1	Scientific meeting	4.0	.92
2	University short courses	3.9	1.01
3	Consulting colleagues	3.9	.91
4	Professional journals & books	3.7	.95
5	Study/journal clubs	3.6	1.07
6	Videotapes	3.3	1.14
7	Self-directed learning	3.3	1.09
8	Audio tapes	2.8	1.07
9	Drug/equipment representatives	2.2	.96

Responding Alberta dentists did not indicate any "high" preference forms of CE. Respondents indicated that scientific meetings, university short courses, consulting colleagues, professional journals and books, and study/journal clubs were "moderately" preferred forms of CE. Videotapes, self-directed learning, and audio tapes were "low" preference forms of CE, and drug/equipment representatives were indicated as "very low" preference forms of CE. There was a narrow range of deviation of responses from .91 to 1.14.

Respondents were provided with the opportunity to make suggestions regarding other preferred forms of CE. Seven individuals offered suggestions, but no themes emerged in their responses.

In Part II, question 5, respondents indicated their interest in CE on a five-point Likert scale ranging from "no interest" to "high interest." Table 4.12 presents these data in rank order from the highest to the lowest level of interest. Of all respondents, 97.2% indicated a "moderate" to "high" interest in CE. Less than 3% indicated a "low" interest and no one indicated a "very low" or "no" interest in CE.

Table 4.12: Level of Expressed Interest in CE
(N=178)

Rank	Level of Interest	Frequency	Percent
1	High	102	57.3
2	Medium	71	39.9
3	Low	5	2.8
		178	100.0
Mean=4.6	Standard Deviation=.04		

In Part II, question 6, respondents were asked to indicate their preferred location for attending CE offerings. Because a number of respondents selected more than one response regarding their preference of location the totals in Table 4.13 exceed the number of respondents. The frequency of positive responses indicated that 50.6% preferred Calgary as a location for CE programs closely followed by Edmonton (46.1%). Red Deer (8.3%), Lethbridge (5.6%), and Grande Prairie (3.9%) were indicated to be low preference locations. These findings were consistent with the population of dentists in these areas. The areas such as Calgary and Edmonton which have the largest number of dentists have been shown to be the most popular locations for CE offerings. Programs offered in these areas, however, may not meet the needs of rural practitioners. Of all respondents, 13.3% would prefer to attend CE offerings presented in "other" locations.

Table 4.13: Preferred Location for CE Offerings

Location	Frequency of Positive Responses	Percent
Calgary	91	50.6
Edmonton	83	46.1
Red Deer	15	8.3
Lethbridge	10	5.6
Grande Prairie	7	3.9
Other	24	13.3

Twenty-three respondents provided 29 suggestions for other locations. Several of the respondents suggested a format that combines CE and a vacation or family vacation. Table 4.14 presents the other suggested locations. Of the "other" suggestions, Banff, Jasper and warm climates were the most frequently recommended locations.

Table 4.14: Other Suggested CE Locations
(N=29)

Rank	Location	Frequency	Percent
1	Banff	6	20.7
2	Jasper	5	17.2
3	Warm climates	5	17.2
4	Vancouver	4	13.8
5	Out of country	2	6.9
6	Medicine Hat	2	6.9
7	Other	5	17.2
		29	99.9

In Part II, question 7, respondents were asked to indicate their preferred day of the week for attending CE offerings. Because a number of respondents selected more than one response regarding their preference for day of the week, totals in Table 4.15 exceed the number of respondents. Friday (65.6%) and Saturday (38.9%) were chosen as the most popular days for CE programs, followed by Monday (16.1%) and Sunday (14.4%). Tuesday (2.8%), Thursday (2.8%), and Wednesday (2.2%) were indicated to be the least popular days for CE programs. The overhead cost in most dental practices is high and so it is reasonable that dentists preferred to attend CE offerings on their days off, at the end of the week when their productivity begins to lessen or at the beginning of the week.

Table 4.15: Preference for Day of the Week

Day of the Week	Frequency	Percent
Friday	118	65.6
Saturday	70	38.9
Monday	29	16.1
Sunday	26	14.4
Tuesday	5	2.8
Thursday	5	2.8
Wednesday	4	2.2

Current Practice Patterns and Demographics

In this section, the data which addressed the current practice patterns and demographics of Alberta dentists are reported and discussed. Table 4.16 presents the current practice pattern data by frequency and percentage distribution. Of the responding Alberta dentists, 89.4% were involved in general practice, while 8.9% were engaged in specialty practice. Those involved in areas other than general or specialty practice accounted for 1.7% of the group (see Appendix H).

The majority of responding Alberta dentists worked full-time (88.0%) in solo practices (59.4%). Less than 12% indicated that they worked part-time and the majority (65.0%) of those worked between 20 and 39 hours per week.

The demographics are presented in Table 4.17 by frequency and percentage distribution (see Appendix H). The majority (91.9%) of the responding Alberta dentists were males. The largest percentage of those responding (43.0%) graduated between 1971 and 1982. Those graduating between 1983 to 1993 formed the next largest group (32.4%) of respondents, followed by those graduating prior to 1970 (24.6%). The majority of the responding dentists (67.8%) worked in urban practices. The second largest group (19.0%) worked in suburban practices and smallest group of professionals (13.2%) operate rural practices.

Table 4.16: Current Professional Practice Patterns

Variable	Frequency	Percent
Type of Practice		
General	160	89.4
Specialty	16	8.9
Other	3	1.7
	179	100.0
Nature of Practice		
Solo	101	59.4
Group	69	40.6
	170	100.0
Type of Work		
Full-time	147	88.0
Part-time	20	11.9
	167	99.9
Hours Per Week (if part-time)		
21-39 hours	13	65
20 hours or less	7	35
	20	100

Table 4.17: Current Demographics of Alberta Dentists

Variable	Frequency	Percent
Gender		
Male	158	91.9
Female	14	8.1
	172	100.0
Year of Graduation		
1983-1993	58	32.4
1971-1982	77	43
Prior to 1970	44	24.6
	179	100.0
Practice Location		
Urban	118	67.8
Suburban	33	19.0
Rural	23	13.2
	174	100.0

Effect of Practice Patterns and Demographic Characteristics on the Perceived CE Needs and Preferred Learning Activities

In this section, the effect of current practice patterns and demographic characteristics of Alberta dentists on their perceived CE needs and preferred learning activities are reported. The following independent variables were considered: type of practice, nature of practice, hours of practice, gender, year of graduation, and practice location.

Two methods of parametric statistics, the t-test and one-way analysis of variance were used to test for significant differences between and among the means of respondent groups. The t-test was used for practice patterns and demographic variables collapsed into two meaningful groups. The results are reported at $p<0.05$ level of significance for the t-value; the higher the t-value, the less likely it was that the difference happened by chance.

The variables such as practice location and year of graduation were collapsed into three groups and were tested for significant differences among the means by using the analysis of variance procedure. This statistical analysis provides the F ratio which indicates whether the mean scores on one or more factors differ significantly from each other. The statistical significance of the F ratio for the one-way analysis of variance was set at $p<0.05$. The higher the F ratio, the less likely it was that the difference happened by chance. The null hypothesis stated that all group means were equal. However, since the alternative hypothesis did not specify which pairs were not equal, the Scheffe' procedure was used to determine which pairs of means differed significantly at $p<0.05$. Only the significant findings are reported.

Purposes of CE and the nature of dentists' practice. Table 4.18 shows the significant differences regarding the perceived purposes of CE by the nature of dentists' practice. The mean responses of Alberta dentists involved in group practice were consistently greater than those of dentists involved in solo practice regarding three of the seven purposes of CE: keeping abreast of advances, understanding technical advances, and acquiring new skills. It appears that professionals who may be somewhat more isolated in their practice do not perceive these three purposes of CE to be as important as those

Table 4.18: T-Test Analysis for Mean Scores of Purposes of Continuing Education by Nature of Dentists' Practice

Purposes of CE	Group	Solo	t Value	p
Keeping abreast of advances	4.6	4.3	3.31	.00
Understanding technical advances	4.4	4.1	2.56	.01
Acquiring new skills	4.5	4.3	2.11	.04

involved in group practice. Possibly peer group pressure and the opportunities for collegiality which are more readily available in group practice influence the perception of the importance of these three purposes.

Perceived CE needs and the type of practice. The effect of independent variables on the perceived CE needs of Alberta dentists was examined only on the 41 "moderate" CE needs. Table 4.19 shows the significant differences in perceived learning needs of general and specialty dentists. The mean responses of Alberta dentists involved in general practice were consistently higher in 25 of the 41 "moderate" CE needs than those of dentists involved in specialty practices. These findings were to be expected because specialists restrict their practice to their specialty and would not have a need for CE in other subject areas. These findings were consistent with the findings of Ross, Smith, Smith and Waldrep (1981). It would have been helpful to separate these two groups prior to the study, but it was not possible because all licensed dentists in the province were included in the ADA membership list.

Perceived CE needs and the nature of practice. Table 4.20 presents significant differences between group means regarding the 41 "moderate" CE needs according to the nature of their practice (e.g., solo or group practice). The mean responses of Alberta dentists involved in group practices were consistently higher in 20 of the 41 "moderate" CE needs than the mean responses of those involved in solo practices. Because group practice facilitates collegial interaction and opportunities for informal learning these results are quite interesting. It is possible that peer interaction raises the level of awareness of CE needs. These findings support the comments of Bader (1987) and Nakamoto and Verner (1972) who cautioned that CE was particularly important for dentists because they tend to be isolated in their practice, spend less time reading professional journals, have less exposure to

Table 4.19: T-Test Analysis for Mean Scores of 41 "Moderate" Learning Needs

by Type of Practice

"Moderate" Learning Needs	General	Specialty	t Value	p
Esthetics: Materials	4.2	2.7	3.83	.00
Basic science: Dental materials	4.1	3.3	2.87	.01
Operative: Restorative materials	4.1	2.8	3.62	.00
Operative: Tooth colored restoration	4.1	2.5	4.25	.00
Esthetics: Bonding	4.0	2.4	5.40	.00
Periodontics: Diagnosis & treatment planning	3.9	3.0	2.48	.03
Periodontics: Non-surgical treatment	4.0	2.4	3.86	.00
Fixed prosthodontics: Techniques	3.9	2.6	3.47	.00
Endodontics: Techniques	3.9	2.4	4.11	.00
Occlusion: TMJ dysfunction	3.8	3.0	2.28	.04
Endodontics: Materials & devices	3.9	2.4	5.57	.00
Esthetics: Veneers	3.9	2.2	4.72	.00
Other: Medical emergencies	3.8	3.1	2.39	.02
Other: Dental emergencies	3.8	2.7	3.93	.00
Fixed prosthodontics: Materials & devices	3.8	2.5	3.57	.00
Fixed prosthodontics: Diagnosis & treat. planning	3.8	2.6	3.17	.01

Table 4.19, continued

"Moderate" Learning Needs	General	Specialty	t Value	p
Esthetics: Bleaching	3.8	2.6	4.39	.00
Periodontics: Soft tissue surgery	3.8	2.5	4.41	.00
Occlusion: Appliances	3.7	2.4	3.41	.00
Orthodontics: Interceptive therapy	3.6	2.8	2.80	.01
Endodontics: Diagnosis & treatment planning	3.6	2.8	3.09	.00
Removable prosthodontics: New techniques and materials	3.7	2.3	4.92	.00
Esthetics: Porcelain inlay/onlay	3.6	2.1	5.10	.00
Occlusion: Oral rehabilitation	3.6	2.5	2.93	.01
Orthodontics: Space management	3.6	2.6	3.31	.00

Table 4.20: T-Test Analysis for Mean Scores of 41 "Moderate" Learning Needs by Nature of Practice

Perceived Learning Needs	Group	Solo	t Value	p
Esthetics: Materials	4.3	3.9	2.63	.01
Basic sciences: Dental materials	4.2	3.9	2.10	.04
Esthetics: Bonding	4.2	3.7	2.66	.01
Fixed prosthodontics: Techniques	4.1	3.6	2.88	.01
Endodontics: Techniques	4.0	3.7	2.20	.03
Esthetics: Veneers	4.0	3.6	2.61	.01
Other: Medical emergencies	4.0	3.5	3.04	.00
Other: Dental emergencies	3.9	3.6	2.23	.03
Fixed prosthodontics: Materials and devices	4.0	3.5	2.60	.01
Fixed prosthodontics: Diagnosis and treatment planning	3.9	3.6	2.28	.02
Other: Anesthesia/pain control	4.0	3.5	2.75	.01
Other: CPR	3.9	3.5	1.98	.05
Basic sciences: Pharmacology	3.8	3.5	2.46	.02
Oral diagnosis: Oral medicine	3.8	3.5	2.10	.04
Fixed prosthodontics: Implants	3.7	3.4	2.00	.05
Occlusion: Appliances	3.8	3.4	2.34	.02
Orthodontics: Interceptive therapy	3.8	3.4	2.20	.03
Esthetics: Porcelain inlay/onlay	3.8	3.3	2.98	.00
Orthodontics: Space management	3.8	3.3	3.06	.00
Orthodontics: Diagnosis	3.8	3.3	2.96	.00

pharmaceutical representatives and have fewer institutional collegial contacts than physicians.

Perceived CE needs and employment status. The significant differences between group means regarding the 41 "moderate" CE needs according to employment status (e.g., full-time or part-time) are presented in Table 4.21. The mean responses of full-time professionals were consistently higher in five areas of practice management from the 41 "moderate" CE needs than were the mean responses of those working part-time. Because overhead costs of owning and operating a dental practice are between 60-70%, it is possible that most part-time professionals are employed by other dentists. If this premise is correct, part-time professionals may perceive a lower need for the subject areas relating to practice management.

Perceived CE needs and part-time status. The significant differences between group means according to the results of t-test analysis regarding the 41 "moderate" CE needs and the independent variables of part-time professionals (e.g., working 20 hours or less and working 21-39 hours) are presented in Table 4.22. With the exception of Esthetics: bonding, the mean responses of Alberta dentists working 20 hours per week or less were consistently lower in six of the 41 "moderate" CE needs than were the mean responses of those working 21-39 hours per week. Five of these needs related to the area of practice management and one related to new techniques and materials in removable prosthodontics. Because it is unlikely that these dentists are self-employed, their need for information in this subject area may be limited. The mean responses of those working 20 hours per week or less were higher for Esthetics: bonding than were the mean responses of those working 21-39 hours per week. Bonding is a relatively new technique and patient acceptance is increasing. It is possible that patients are requesting this

Table 4.21: T-Test Analysis for Mean Scores of 41 "Moderate" Learning Needs

by Employment Status

Perceived Learning Needs	Full-time	Part-time	t Value	p
Practice management: Total quality management	3.7	2.7	2.73	.01
Practice management: Practice development	3.7	2.9	2.37	.03
Practice management: Office management	3.6	2.8	2.48	.02
Practice management: Financial management	3.6	2.7	3.53	.00
Practice management: Communication	3.6	2.6	3.75	.00

Table 4.22: T-Test Analysis for Mean Scores of "Moderate" Learning Needs

by Part-time Status

Perceived Learning Needs	20 Hrs or <	21-39 Hrs	t Value	p
Esthetics: Bonding	4.7	3.7	-2.45	.03
Practice managment: Total quality managment	1.7	3.2	2.40	.03
Practice management: Practice development	1.7	3.5	2.86	.01
Removable prosthodontics: New techniques and materials	2.3	3.5	2.34	.03
Practice management: Office management	1.6	3.4	3.17	.01
Practice management: Financial management	1.4	3.3	4.51	.00
Practice management: Communication	1.4	3.2	3.54	.00

treatment and that part-time professionals working 20 hours or less feel the need for CE in order to competently provide it.

Perceived CE needs and practice location. The differences among group means regarding the 41 "moderate" CE needs according to practice location (e.g., rural, suburban, and urban) were examined by the analysis of variance (F test), followed by the Scheffe' procedure.

Table 4.23 shows only two significant differences by practice location. The mean responses of Alberta dentists practicing in suburban locations were higher in the area of Esthetics: posterior composites, followed by dentists in urban and rural locations, while the mean responses of professionals in rural and suburban locations were higher in the area of Orthodontics: interceptive therapy than the mean responses of those working in urban locations. In neither comparison did the Scheffe' procedure identify pairs that differed significantly.

Perceived CE needs and year of graduation. The F-test, followed by the Scheffe' procedure, was also used in examining differences among group means regarding the 41 "moderate" CE needs and year of graduation (e.g., prior to 1970, 1971-82, and 1983-93). Table 4.24 shows the significant differences.

The mean responses of Alberta dentists graduating prior to 1970 were consistently lower than the mean responses for those graduating between 1983-93 in 11 of the 41 "moderate" CE needs. The mean responses of dentists graduating prior to 1970 were also lower than the mean responses for those graduating between 1971-82 in six of these 11 "moderate" CE needs. There was an inverse relationship between year of graduation and degree of perceived need in several of the "moderate" CE needs; six of the areas related

Table 4.23: F-Test Analysis for Mean Scores for "Moderate" Learning Needs

by Practice Location

Perceived Learning Needs	Group #1	Group #2	Group #3			
	Rural	Suburban	Urban	F Ratio	p	Scheffe' Pairs
Esthetics: Posterior composites	3.3	4.1	3.6	3.07	.05	none
Orthodontics: Interceptive therapy	3.9	3.9	3.4	3.38	.04	none

Table 4.24: F-Test Analysis for Mean Scores of "Moderate" Learning Needs

by Year of Graduation

Perceived Learning Needs	Group #1	Group #2	Group #3			
	Prior to 1970	1971-82	1983-93	F Ratio	p	Scheffe' Pairs
Periodontics: Non surgical treatment	3.6	3.8	4.0	3.71	.03	3>1
Practice management: TQM	3.2	3.7	3.7	4.15	.02	3>1
Occlusion: Appliances	3.2	3.6	3.7	3.48	.03	3>1
Practice management: Risk mgmt.	3.1	3.7	3.7	4.37	.01	3>1
Orthodontics: Interceptive therapy	3.0	3.7	3.8	6.53	.00	3>1; 2>1
Practice management: Office mgmt.	3.0	3.6	3.7	5.58	.00	3>1; 2>1
Practice management: Career stress	3.0	3.7	3.7	4.48	.01	3>1; 2>1
Practice management: Financial mgmt.	3.0	3.7	3.7	6.30	.00	3>1; 2>1
Orthodontics: Space management	2.8	3.5	3.9	11.75	.00	3>1; 2>1
Practice management: Communication	3.0	3.5	3.7	5.04	.01	3>1
Orthodontics: Diagnosis	2.9	3.6	3.7	7.78	.00	3>1; 2>1

to practice management. It is possible that the longer professionals have been in practice, the more they have learned about this subject area; this would reduce their CE need. The other subject areas were more difficult address. It is possible that professionals who have been practicing longer have had more experience in these areas or have had the opportunity to enhance their knowledge and skills through CE programs. It is also possible that they are not interested in expanding their knowledge and skills in these areas of practice as seasoned professionals sometimes limit their practice to areas of special interest and ability (see Table 4.24).

Willingness to attend educational programs using various educational methodologies and type of practice. The t-test was used in examining differences among group means regarding the willingness to attend programs that utilized various educational methodologies and the type of practice. Table 4.25 shows the single significant difference. Dentists in specialty practice indicated a greater willingness to attend programs that utilized small group discussion than did those in general practice.

Willingness to attend educational programs using various educational methodologies and gender. The t-test was utilized to examine differences among group means regarding the willingness to attend programs that used various educational methodologies and gender. Table 4.26 shows the single significant difference. Females indicated a greater willingness to attend programs that utilized hands on practice than did males.

Preferred forms of CE and type of practice. The t-test was utilized to examine differences among group means regarding preferred forms of CE and type of practice. Table 4.27 shows the significant differences. Dentists in specialty practice indicated a greater preference for scientific meetings while

Table 4.25: T-Test Analysis for Mean Scores of Willingness to Attend Educational Programs That Utilized Various Methodologies by Type of Practice

Various Educational Methodologies	Specialty	General	t Value	p
Small group discussion	3.9	3.3	2.08	.04

Table 4.26: T-Test Analysis for Mean Scores of Willingness to Attend Educational Programs That Utilized Various Methodologies by Gender

Various Educational Methodologies	Female	Male	t Value	p
Hands on practice	4.9	4.4	5.25	.00

Table 4.27: T-Test Analysis for Mean Scores of Preferred Forms of CE by Type of Practice

Preferred Forms of CE	General	Specialty	t Value	p
Scientific meetings	4.0	4.6	-4.02	.00
Consulting colleagues	3.9	3.4	2.26	.03
Videotapes	3.4	2.6	2.71	.01
Drug/equipment representatives	2.3	1.8	2.17	.04

those in general practice indicated a greater preference for consulting with colleagues. Neither group indicated a preference for videotapes or drug/equipment representatives but general practitioners indicated a greater preference than did specialists.

Preferred forms of CE and gender. The t-test was utilized to examine differences among group means regarding preferred forms of CE and gender. Table 4.28 shows the single significant difference. Females indicated a greater preference for study/journal clubs than did males.

Open-ended Comments

The questionnaire to determine the perceived CPE needs of Alberta dentists included a section which invited additional comments regarding CE offerings (see Appendix A, Part III, Question 7). These comments were examined to discover the frequency of responses and common themes.

A majority of responding Alberta dentists (55%) chose not to make additional comments or suggestions to improve CE offerings (see Table 4.29). A total of 149 comments were made by the 81 dentists who chose to respond, an average of 1.9 comments per dentist. Content analysis of the dentists' open-ended comments revealed seven major themes (see Table 4.30). The frequency distribution within these themes is shown in Tables 4.31 to 4.36.

The theme which recurred most frequently when analyzing Alberta dentists' open-ended comments was the concern for the quality of CE courses offered (see Table 4.31 & Appendix F). These 49 comments represented 33% of the total responses. The most frequent responses among those who commented on the quality of CE courses suggested satisfaction with the current quality of courses offered (18.4%), a need for the regulation of

Table 4.28: T-Test Analysis for Mean Scores of Preferred Forms of CE by Gender

Preferred Forms of CE	Female	Male	t Value	p
Study/journal clubs	4.2	3.5	2.48	.01

commercial sponsors/presenters (18.4%) and the need for more hands on practice (16.4%).

Table 4.29: Open-ended Comments
(N=180)

Open-ended Comments	Frequency	Percent
No	99	55
Yes	81	45
	180	100

Table 4.30: Open-ended Comments: Major Themes

Themes	Frequency	Percent
Quality of courses	49	33
Suggested topics	35	23
Timing & location of courses	19	13
Mandatory CE requirements	19	13
Sponsors of CE	12	8
Suggested CE formats	10	7
Cost of courses	5	3
	149	100

Table 4.31: Open-ended Comments: Quality of CE Courses
(N=49)

Quality of CE courses	Frequency	Percent
Satisfied with quality	9	18.4
Need for regulation of commercial sponsors/presenters	9	18.4
Need for more hands on sessions	8	16.4
Need courses relevant to practical aspects of daily practice	6	12.2
Sessions longer than required	6	12.2
Need yearly provincial list of courses & credits offered	2	4.1
Bring in top quality presenters	2	4.1
Use local specialists as presenters	2	4.1
Need accurate descriptions of course content	2	4.1
Other	3	6.1
	49	100.1

Suggestions for CE topics represented 23% of the total responses and together, formed the second most frequent theme (see Table 4.30). The most frequently identified need was in the area of new materials, products and techniques (see Table 4.32 & Appendix G). Several comments indicated a need for a resource person, specializing in dental materials, at the Faculty of Dentistry, UofA. Thirteen percent of Alberta dentists' open-ended comments referred to suggestions regarding the timing and location of courses (see Table 4.33).

Table 4.32: Open-ended Comments: Suggested CE Topics
(N=39)

Topics	Frequency	Percent
New materials & techniques	16	41.0
Orthodontics	3	7.7
Implantology -- offered locally	2	5.1
Other	18	46.2
	39	100.0

Of the nineteen who commented on timing and location, 26% suggested that more hands on and condensed UofA courses be offered in Calgary. Twenty-one percent of these respondents requested two or three day courses offered in vacation locations and an additional 21% suggested that condensed courses be delivered in rural areas of the province (see Table 4.33).

Table 4.33: Open-ended Comments: Timing & Location of CE Courses
(N=19)

Timing & Location	Frequency	Percent
More hands-on & condensed UofA courses offered in Calgary	5	26
More 2-3 day intensive courses in vacation locations	4	21
Condense courses & deliver in rural areas	4	21
Friday or Saturday courses in cities for rural dentists	2	11
Other	4	21
	19	100

Both positive and negative comments regarding mandatory continuing education requirements emerged as a theme in 13% of the comments (see Tables 4.30 & 4.34). Comments opposing mandatory CE included concerns with the professionals' ability to select relevant and value-added courses based on the information available to them. Examples cited described the selection of courses which provided CE credits to attendees, but were costly in both time and financial resources and were perceived to be "a total waste of time."

Comments regarding sponsors of CE emerged as a theme in 8% of the suggestions to improve CE offerings (see Tables 4.30). Fifty percent of these comments related to the UofA sponsorship of CE programs. The level of satisfaction varied from satisfied, to an expressed concern that courses were not relevant to the needs of the practicing dentists. Concern was expressed that the same topics were presented year after year. It was suggested that a workshop on in-office sterilization be delivered in every large centre this year. The subject was identified as a need for all staff and as a cost effective way for practitioners to meet this need. Another suggestion included the development and delivery of a one-week update in the field of dentistry, to be held every one to two years.

The acceptance of additional CE formats for mandatory CE credit was mentioned by 7% of the respondents (see Table 4.30). Fifty percent of these comments related to suggestions that audio and video tapes be recognized for CE credit (see Table 4.35).

Table 4.34: Open-ended Comments: Mandatory CE
(N=19)

Mandatory CE	Frequency	Percentage
Opposition to mandatory CE	12	63.2
Support mandatory CE	5	26.3
Support for survey & its relationship to improving CE	2	10.5
	19	100.0

Table 4.35: Open-ended Comments: Suggested CE Formats
(N=10)

Suggested Formats	Frequency	Percent
Audio & video tapes (with CE credit approval)	5	50
Self study (with CE credit approval)	2	20
Study clubs	2	20
Computer-assisted learning (with CE credit approval)	1	10
	10	100

Table 4.36 indicates that all respondents who expressed concerns regarding the cost of CE offerings felt it was excessive. Several comparisons were made to the lower cost of courses offered by the University of Saskatoon with those offered by the UofA.

Table 4.36: Open-ended Comments: Cost of CE Courses
(N=5)

Cost of Courses	Frequency	Percent
Cost is excessive	5	100
	——	——
	5	100

Summary

This chapter presented the results of the data analyses that were carried out in this study. The findings were summarized and presented in appropriate tables to address the four research questions of the study. The quantitative data obtained were summarized and reported by frequency, percentage distribution and measures of central tendency and variability. The qualitative data were presented and summarized according to frequency of responses and emerging themes.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This chapter includes the summary, conclusions, implications of the research study, and recommendations for further study.

Summary

A summary of the purpose, literature review, methodology, data analysis, and findings are discussed.

The purpose. The purpose of this study was to identify the perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics of Alberta dentists and to identify relationships among them. The findings will be shared with the ADA and the Faculty of Dentistry, UofA, and may ultimately be used in the planning, development, and implementation of CDE programs in Alberta.

The literature review. Because of the dearth of literature focusing on the continuing education needs of dental professionals in Canada, more generally related topic areas were reviewed. The review revealed a lack of consensus regarding the role of professions in society, the relationship of CE to competence and performance in health care professionals, the purposes of CPE, the focus and content of CPE programs, and appropriate providers of CPE. The review exposed both unprecedented interest and confusion in the field of CPE as professions seek to deal with the rapid proliferation of new knowledge, technological and social change, and increased need for public accountability.

Six models of CPE were examined: the Update, Competence, Performance, Education, Change, and Problem-based models. The Update, Competence, and Education Models had severe limitations that were addressed in part or in whole by the Performance, Change, and Problem-based models. There was consensus that the Update Model still reflected current practice in the field of CPE.

The purposes of CPE, the issues surrounding program development and the implications for program delivery were reviewed. A lack of consensus regarding the role of CPE in changing practice and enhancing competence was evident. There was, however, an emerging agreement with essential CPE program elements that would assist planners in meeting the changing needs of professionals. A strong commitment to understanding the learning needs of professionals, reducing barriers to participation, utilizing preferred learning methodologies, and identifying preferred times and locations was evident.

The methodology. A descriptive survey method was employed to obtain data for the study. A questionnaire was developed utilizing other questionnaires, subject experts, and the literature review. The questionnaire was pilot tested by six dentists from British Columbia. A random sample of 300 Alberta dentists were surveyed; 180 usable questionnaires were returned equaling a 60% response rate.

The quantitative data were analyzed using descriptive and inferential statistics. The first phase of the data analysis provided a summary description of answers to the four research questions. The second phase of analysis determined relationships among respondents' perceived CE needs, their preferred learning activities, their current practice patterns and demographic characteristics through the use of the t-test, ANOVA, and the Scheffe' procedure.

The qualitative data obtained from the open-ended questions were analyzed according to the frequency of responses and emerging themes.

Findings. A summary of the findings is presented in relation to the four research questions.

1. Research question one: What are the perceived continuing education needs of Alberta dentists?

Continuing education was perceived by Alberta dentists to be important in keeping abreast of advances, acquiring new knowledge, updating knowledge, understanding technical advances, acquiring new skills, updating skills, and reinforcing that they are doing things correctly. Of these seven purposes, keeping abreast of advances and acquiring new knowledge were the two highest ranked purposes for pursuing CE.

The majority of Alberta dentists had not experienced a need for information or skills that was unmet within the past year. Of the minority who indicated an unmet need, the highest levels of need cited were in the subject areas of implantology techniques, dental materials, periodontics, and orthodontics.

Respondents were asked to identify their anticipated needs in 15 subject areas further defined into 84 learning needs over the next five years. No perceived learning needs received the ranking of "high" need. Forty-one learning needs were ranked as "moderate" needs. Of these "moderate" needs, dental materials used in esthetic dentistry, dental materials in general and restorative materials used in operative dentistry were ranked as the highest learning needs. Other "moderate" learning needs were focused in the subject areas of esthetic, operative, periodontic, endodontic, fixed prosthodontic, and orthodontic dentistry and practice management (see Table 4.5).

Thirty-nine of the learning needs were ranked as "low" need and four were ranked as "very low" need (see Tables 4.6 & 4.7). Respondents had the opportunity to make other suggestions regarding learning needs. Eight individuals offered eleven different suggestions, but no common themes emerged in their responses.

2. Research question two: What are their preferred learning activities?

Alberta dentists indicated that hands on practice was perceived to be the most effective educational methodology for facilitating their learning. Workshops and lectures were also perceived to be effective. While panel discussions were perceived to be moderately effective, they were determined to be the least effective of the seven educational methodologies in facilitating learning.

Alberta dentists indicated that they would "very likely" attend CE sessions that utilized a lecture, hands on practice or workshop methodology.

Barriers that would "very likely" inhibit their pursuit of CE included the following: the course is not relevant to their needs, inconvenient time, and inconvenient location. Time constraints, the credibility of the sponsor, family responsibilities, overhead costs, course cost and insufficient information regarding the course were indicated as "probable" barriers to the pursuit of CE.

Alberta dentists did not indicate any "high" preference forms of CE. They indicated a "moderate" preference for scientific meetings, university short courses, consulting colleagues, professional journals and books, and study/journal clubs. Videotapes, self-directed learning, and audio tapes were "low" preference forms of CE, and drug/equipment representatives were indicated as "very low" preference. Seven individuals offered suggestions, but no common themes emerged in their responses.

The majority of responding dentists expressed a high interest in CE; no one indicated "very low" or "no" interest.

Calgary and Edmonton were the preferred locations for CE, followed by Red Deer, Lethbridge, and Grande Prairie. Several respondents suggested other locations and Banff, Jasper, and warm climates were among the most frequently recommended.

Friday and Saturday were chosen as the most popular days of the week for CE, followed by Monday and Sunday. The mid-week days of Tuesday, Wednesday, and Thursday were the least popular days.

3. Research question three. What are their current practice patterns and demographic characteristics?

The majority of responding dentists were males who were working full-time, in urban, solo practices and who graduated between 1971 and 1982. Of those indicating part-time practice, the majority worked between 21 and 39 hours per week.

4. Research question four. What relationships exist among their perceived continuing education needs, preferred learning activities, current practice patterns and demographic characteristics?

Alberta dentists involved in group practice consistently found three purposes of CE to be more important than did solo practitioners: keeping abreast of advances, understanding technical advances and acquiring new skills.

Full-time professionals expressed a higher need for CE in five areas relating to practice management than did part-time practitioners. Part-time professionals working 20 hours a week or less indicated a lower need for five areas relating to practice management and for new techniques and materials in Removable Prosthodontics, and a higher need for Esthetics: bonding than did those working 21-39 hours per week.

There were only two significant differences identified by practice location. Alberta dentists practicing in suburban locations had a higher need for Esthetics: posterior composites, while rural and suburban professionals had a higher need in the area of Orthodontics: interceptive therapy.

The need expressed by dentists graduating prior to 1970 was consistently lower than that of those graduating between 1983 and 1993 in 11 of the 41 "moderate" learning needs. These findings could reflect Schon's (1987) theory that a professional's knowledge base is built, in part, by the experience gained from specific cases in professional practice which are, in turn, used to help shape the response to current problems.

There was a single significant difference regarding willingness to attend CE programs using various educational methodologies by type of practice. Dentists in specialty practice identified a greater willingness to attend CE programs that utilized small group discussion than did those in general practice. Dentists in specialty practice indicated a greater preference for scientific meetings as a preferred form of CE than did dentists in general practice. Dental professionals in general practice indicated a greater preference for consulting colleagues than did dentists in specialty practice.

There was a single significant difference regarding willingness to attend CE programs using various educational methodologies by gender. Female dentists indicated a greater willingness to attend programs that utilized hands on practice than did male dentists. A single significant difference was identified regarding preferred forms of CE and gender. Female dentists indicated a greater preference for study/journal clubs than did male dentists.

5. General comments. The majority of dentists chose not to make additional comments or suggestions to improve CE offerings, but the following seven themes emerged from the comments that were provided: quality of courses, suggested topics, timing and location of courses, mandatory CE requirements, sponsors of CE, suggested CE formats, and cost of courses.

Comments on quality included satisfaction with the quality of courses offered, a need for regulation of commercial sponsors/presenters, and the need for more hands on practice. Comments relating to suggested topics included new materials, products, and techniques in dentistry. Several comments indicated a need for a resource person, specializing in dental materials, at the Faculty of Dentistry, UofA. Requests for more hands on practice and condensed UofA courses offered in Calgary, two or three day courses offered in vacation locations and condensed courses offered in rural locations were included in comments relating to the timing and location of courses.

Comments were made in support of and opposition to mandatory CE as well as of sponsors of CE. Some expressed satisfaction while other complained that courses were not relevant to the needs of practicing dentists and that the same topics were presented year after year. It was suggested that a workshop on in-office sterilization be delivered in every large centre this year to meet a need for all staff, and as a cost effective way for practitioners to meet this need. Suggestions were made to recognize audio and videotapes for CE credit. A few respondents expressed the concern that the cost of CE offerings was excessive.

Conclusions

The following conclusions are derived from the findings related to perceived CE needs, preferred learning activities, current practice patterns and demographic characteristics of Alberta dentists and significant relationships among these data. These conclusions may be generalized to the population of Alberta dentists as defined in this study.

1. Alberta dentists perceive that their current continuing education needs are being met through the programs that are offered by a variety of sponsors. The curriculum driven, Update Model, which accurately reflects the current field of CPE, is being utilized by program providers. Unfortunately, "being up to date is only one aspect of the relationship of knowledge and skill to competence" (Nowlen, 1988, p. 31). Alberta dentists have a high interest in CE and have an interest in assessing their perceived CE needs. Subsequently, a gradual evolution from the use of the Update Model to the Performance Model which considers collective performance as well as individual performance (Nowlen, 1988), the Change Model, which focuses on changing practice (Nowlen, 1988), or the Problem-based Model, which bridges the gap between scientific and professional knowledge (Belsheim, 1986) would provide a far more comprehensive approach to CE for these committed professionals.

2. Alberta dentists are complex and sophisticated learners. They have identified hands on practice, workshops and lectures as preferred CE methodologies with an emphasis on hands on practice. Because they utilize CE to maintain or enhance their competency, it is probable that their "performance is adapted, modified, refined, or altered to meet new demands, incorporate new information, or react to improved ideas (Bennett & Fox, 1993, p. 268). Bennett (1990) suggested the improvement of CE requires a shift

in emphasis from the content being delivered to the health care professional encountering the content. Conn (1992) described the greatest advances in undergraduate medical education during the 19th century as the movement of the educational process from the classroom to the bedside and recommended a similar shift in the approach to continuing medical education. Some providers of CDE in Alberta have already facilitated this shift from lecture room to dental operatory. A greater emphasis on CE programs that use hands on practice would assist these professionals in enhancing their actual performance under the guidance of other skilled professionals and place the emphasis of CE program on the dentists encountering new techniques and/or materials. Some hands on practice CE programs are offered through the UofA but there is an obvious need for increased offerings using this educational methodology. No comparable facilities are available in the remainder of the province, but it may be possible to rent large group practice facilities on weekends.

3. Many anticipated learning needs of Alberta dentists focused on dental materials in esthetic, operative, periodontic, fixed prosthodontic and endodontic dentistry. Dentists are overwhelmed with the abundance of new materials on the market. It is both costly and difficult to determine which products or materials are the most effective. Dentists appear to be suspicious of professionals directly linked to dental supply companies and would prefer to have access to unbiased and well researched professional information. A dentist in the Faculty of Dentistry, UofA, who specializes in dental materials and related research, would be a beneficial resource to dental professionals in Alberta.

4. There is very little coordination of the CE offerings for dentists in Alberta. Continuing Education, Faculty of Dentistry, UofA, the ADA, the

local dental societies, and a variety of other sponsors are involved in CE but planning and implementation occur at the sponsor level. There is no overall plan. Planning and coordination of CE, either through the Faculty of Dentistry or the ADA, would result in more comprehensive and effective programming and could improve the utilization of scarce resources, reduce duplication of effort, and result in cost savings.

5. A descriptive survey method was employed to obtain the data for this study. The results of the data analysis regarding anticipated learning needs indicated that there were no "high" needs. This finding was unexpected and prompted a review of the questionnaire. The five-point Likert scale ranged from "no," "very low," "low," "moderate" to "high" need. It is possible that Alberta dentists have no "high" learning needs, but it is also possible that the rating scale placed undue emphasis on "no" to "low" needs. If this study were replicated, I would suggest the use of a more balanced five-point Likert scale which includes the following categories: "no," "low," "moderate," "high," and "very high" need.

6. The response rate for this study was 60% and a second mailing was not attempted. This begs the question of whether or not the results would have changed if all subjects returned the questionnaire? In retrospect, because 40% of the respondents failed to return the questionnaire, either a second mailing could have been attempted or a small portion of the nonresponding group could have been randomly selected and interviewed in order to determine the views of nonrespondents. The responses of the nonresponding group could then have been compared with the responses of those who replied initially to determine whether the sample was biased. A sample of non respondents could also have been contacted and compared with the dental population in Alberta.

Implications

The following implications are based on the findings and the conclusions of this study:

1. Consideration should be given to the coordination of CDE offerings in the province. This function could be served by the Director, Continuing Education, Faculty of Dentistry, UofA, or by personnel at the ADA. The position could be funded through a partnership of the UofA, the ADA, and the local dental societies throughout Alberta. This would reduce the duplication of effort which could then be redirected to the improvement of CDE throughout the province. This position could also provide assessments of commercial sponsors/presenters. It would be possible to develop and distribute a quarterly calendar of CDE offerings in the province.

2. Consideration should be given to gradually changing the focus of CDE in Alberta from the Update Model with its obvious limitations, to a more progressive and comprehensive model of CPE. Serious consideration should be given to an evolution from the Update Model to the Performance, Change, or Problem-based model or an appropriate blend of models that is more comprehensive in nature and addresses the issues of competence and performance.

3. Consideration should be given to changing the requirements for mandatory CE in Alberta. The study of Patterson and Thompson (1989) determined that dentists from Alberta, where CDE is mandatory, attended three times as many days of CDE as their Atlantic counterparts, where CDE is optional. Unfortunately, according to Kicklighter (1984) and Young and Willie (1984), the direct link between the involvement of professionals in CE activities, professional competence and quality health care is unclear, at best. Kicklighter (1984) suggested that the extent of participation in CE, which is

currently measured in clock hours and credits, should receive less emphasis and suggested the effectiveness of learning activities not eligible for CE credit be explored for CE efforts to be more individualized and more cost-effective. Bennett and Fox (1993) acknowledged that although some changes accomplished through learning are a consequence of traditional CPE programs, most are a function of the professionals' own self-directed learning curricula. O'Neill (1986) suggested that in CDE today, a focus on clinical courses is insufficient in preparing dental professionals for the tremendous range of forces which impinge upon them.

For these reasons, in the short term the ADA should give consideration to changing the mandatory requirements from 100 hours in the clinical, technical or scientific realm and 50 hours which may or may not be directly related to the practice of dentistry to 150 hours of CE (in a five-year period), relating directly or indirectly to the practice of dentistry. Careful attention should be given to the development of CE offerings that are more individualized and cost-effective for dental professionals, and the possibility of offering educational methodologies not presently eligible for CE credit should be explored. In the longer term, mandatory CE, which focuses on the number of hours dentists attend CE programs, should be abolished and replaced, possibly, with a program of relicensure which focuses on the actual competence and performance of dental professionals in Alberta.

4. The ADA should consider establishing standards of practice for its members. The government and the public are demanding more accountability from professionals and from professional associations. If the professional organization does not have standards of practice for its members, there is no yard stick to facilitate either personal or peer review. In the future,

the ADA should consider ways of evaluating the competence and performance of its members.

5. The Faculty of Dentistry, UofA should ensure that the preservice curricula and the professional relationships between faculty members and students promote lifelong learning skills and attitudes.

Recommendations For Further Study

A number of suggestions for further research seem appropriate. Research based on these suggestions could lead to furthering the understanding of CE needs of dentists.

1. A study could be undertaken to identify the CDE needs of Alberta's rural dentists. Because the numbers of rural dentists is small, in comparison to the numbers of dentists in urban and suburban locations, studies such as this one that concentrate on the needs of all Alberta dentists tend to overlook the needs of this important group. Rural dentists tend to be more isolated from colleagues and from easily accessible opportunities for CE and therefore, it is important to clearly identify their needs and strategies to help meet these needs.

2. Focus groups could be utilized with specific target populations within the Alberta dental profession to more clearly define CE needs (e.g., graduates prior to 1970, 1971-82, and 1983-93). Questionnaires are useful in obtaining factual and unambiguous information from large numbers of subjects in diverse locations, however, focus groups can provide a richer source of more indepth information.

3. A comparative study of CPE programs throughout Alberta/Canada could provide valuable information to planners of CPE. Some CPE planners have been more innovative and progressive while others have been more

traditional. Such a study could contribute to the development of an understanding of current CPE practices in Alberta/Canada.

4. A study, with the purpose of developing a greater understanding of how dentists/health care professionals learn and approach change, could provide useful information that could be used in the design of more effective CDE/CPE interventions.

5. Further study to determine whether CDE changes practice and how the change occurs is essential to the provision of CDE that is effective in meeting the needs of dental professionals.

Concluding Comment

Today's relentless economic, cultural, and technological changes are impacting all aspects of society including professional education. Social and political forces affect the roles of professionals and change the definition of professional skills. Professional education for the future will require stronger bonds between educational systems and systems of practice. Today's climate threatens to make curricula in professional schools obsolete before students graduate and emphasizes the need for integrated systems of CPE.

The Update Model of CPE is inadequate in meeting these accelerating needs. The challenge of continuing professional educators is evolving from helping professionals remain up-to-date to facilitating learner-controlled changes in performance. Past efforts which have been based on the principles of teaching are evolving into programming based on the principles of learning. Fundamental reform in CPE must be directed toward understanding the ways in which professionals integrate discipline-related knowledge into their practice, and developing new models of CPE that address learning from professional practice. The reformed field of CPE must be based on the needs of individual professionals, professions, and society and will focus on the professionals' ability to continually enhance performance through the integration of new knowledge and skills.

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APPENDIX A

Questionnaire

PERCEIVED CPE NEEDS OF ALBERTA DENTISTS

Your input is essential in helping the Faculty of Dentistry and the Alberta Dental Association plan for your continuing professional education needs. This questionnaire will take about 20 minutes to complete. Thank you for your assistance.

PART I - Your current learning needs

Please circle **one** number per item that best represents your answer, or fill in the responses as indicated.

Office Use

1. Do you find you require continuing education to:

_ _ _ _

	No Need	Very Low Need	Low Need	Mod. Need	High Need	
Update knowledge	1	2	3	4	5	5
Update skills	1	2	3	4	5	6
Acquire new knowledge	1	2	3	4	5	7
Acquire new skills	1	2	3	4	5	8
Reinforce that you are doing things correctly	1	2	3	4	5	9
Understand technical advances	1	2	3	4	5	10
Keep abreast of advances	1	2	3	4	5	11

2. In the past year have you experienced a need for information or skills that could *not* be met? 12

1 Yes 2 No

If Yes, please identify a learning need for which help seemed unavailable:

____

____

3. Please rate your *anticipated* need to learn material relevant to your practice, over the next five years, in the following subjects:

	No Need	Very Low Need	Low Need	Mod. Need	High Need	Office Use
Basic Science						
Anatomy	1	2	3	4	5	13
Oral Pathology	1	2	3	4	5	14
Pharmacology	1	2	3	4	5	15
Dental Materials	1	2	3	4	5	16
Physiology	1	2	3	4	5	17
Bacteriology	1	2	3	4	5	18
Nutrition	1	2	3	4	5	19
Endodontics						
Diagnosis & Tx. Plan	1	2	3	4	5	20
Techniques	1	2	3	4	5	21
Materials/Devices	1	2	3	4	5	22
Occlusion						
TMJ Dysfunction	1	2	3	4	5	23
Occlusal Equilibration	1	2	3	4	5	24
Oral Rehabilitation	1	2	3	4	5	25
Appliances	1	2	3	4	5	26
Operative						
Restorative Materials	1	2	3	4	5	27
Tooth Colored Restoration	1	2	3	4	5	28
Pins	1	2	3	4	5	29
Inlays/Onlays	1	2	3	4	5	30
Esthetic						
Bleaching	1	2	3	4	5	31
Posterior Composites	1	2	3	4	5	32
Porcelain Inlay/Onlay	1	2	3	4	5	33
Veneers	1	2	3	4	5	34
Bonding	1	2	3	4	5	35
Materials	1	2	3	4	5	36

	No Need	Very Low Need	Low Need	Mod. Need	High Need	Office Use
Oral Surgery						
Exodontia	1	2	3	4	5	37
Orthognathic Surgery	1	2	3	4	5	38
Implants	1	2	3	4	5	39
Third Molars	1	2	3	4	5	40
Post-Operative Complications	1	2	3	4	5	41
Orthodontics						
Diagnosis	1	2	3	4	5	42
Space Management	1	2	3	4	5	43
Functional Therapy	1	2	3	4	5	44
Corrective Therapy	1	2	3	4	5	45
Interceptive Therapy	1	2	3	4	5	46
Surgical Orthodontics	1	2	3	4	5	47
Appliances	1	2	3	4	5	48
Pedodontics						
Patient Management	1	2	3	4	5	49
Pulpal Therapy	1	2	3	4	5	50
Prevention	1	2	3	4	5	51
Periodontics						
Diagnosis & Tx. Planning	1	2	3	4	5	52
Curettage & Scaling	1	2	3	4	5	53
Soft Tissue Surgery	1	2	3	4	5	54
Osseous Surgery	1	2	3	4	5	55
Splinting	1	2	3	4	5	56
Non-Surgical Treatment	1	2	3	4	5	57
Practice Management						
Auxiliary Utilization	1	2	3	4	5	58
Financial Management	1	2	3	4	5	59
Office Management	1	2	3	4	5	60
Communication	1	2	3	4	5	61
Computers	1	2	3	4	5	62
Total Quality Management	1	2	3	4	5	63
Career Stress	1	2	3	4	5	64
Risk Management	1	2	3	4	5	65
Practice Development	1	2	3	4	5	66

	No Need	Very Low Need	Low Need	Mod. Need	High Need	Office Use
Fixed Prosthodontics						
Diagnosis & Tx. Plan	1	2	3	4	5	67
Techniques	1	2	3	4	5	68
Materials/Devices	1	2	3	4	5	69
Implants	1	2	3	4	5	70
Removable Prosthodontics						
New Techniques/Materials	1	2	3	4	5	71
Precision Attachments	1	2	3	4	5	72
Complete Dentures	1	2	3	4	5	73
Removable Dentures	1	2	3	4	5	74
Oral Diagnosis						
Radiology	1	2	3	4	5	75
Oral Medicine	1	2	3	4	5	76
Physical Evaluation	1	2	3	4	5	77
Public Health						
Education	1	2	3	4	5	78
Prevention	1	2	3	4	5	79
Treatment	1	2	3	4	5	80
Other						
CPR	1	2	3	4	5	81
Anesthesia/Pain Control	1	2	3	4	5	82
Sedation	1	2	3	4	5	83
Electrosurgery	1	2	3	4	5	84
Oral Photography	1	2	3	4	5	85
Geriatrics	1	2	3	4	5	86
Tx. for Handicapped	1	2	3	4	5	87
Medical Emergencies	1	2	3	4	5	88
Forensics	1	2	3	4	5	89
Medically Compromised Patients	1	2	3	4	5	90
Prevention	1	2	3	4	5	91
Consumer Products	1	2	3	4	5	92
Dental Emergencies	1	2	3	4	5	93
Social Problems	1	2	3	4	5	94
Substance Abuse	1	2	3	4	5	95
Preparing for Retirement	1	2	3	4	5	96
Other: (please specify & rate)						
____________________	1	2	3	4	5	97
____________________	1	2	3	4	5	98
____________________	1	2	3	4	5	99

PART II: How you prefer to learn.

Please circle **one** number per item that best represents your answer, or fill in the responses as indicated.

1. How effective are the following educational methods in helping you learn?

	Not Effective		Mod. Effective		Highly Effective	Office Use
Lectures	1	2	3	4	5	100
Panel Discussions	1	2	3	4	5	101
Group Discussions	1	2	3	4	5	102
Question/Answer Sessions	1	2	3	4	5	103
Workshops	1	2	3	4	5	104
Self Instruction	1	2	3	4	5	105
Hands on Practice	1	2	3	4	5	106

2. Would you attend educational programs on topics of interest to you that utilized:

	No	Possibly	Probably	Very Likely	Definitely	
Lectures	1	2	3	4	5	107
Small Group Discussion	1	2	3	4	5	108
Workshops (Interactive)	1	2	3	4	5	109
Hands on Practice	1	2	3	4	5	110

3. How do the following barriers affect your pursuit of continuing professional education:

	No	Possibly	Probably	Very Likely	Definitely	
Courses not relevant to my needs	1	2	3	4	5	111
Inconvenient time	1	2	3	4	5	112
Inconvenient location	1	2	3	4	5	113
Time constraints	1	2	3	4	5	114
Office overhead costs	1	2	3	4	5	115

	No	Possibly	Probably	Very Likely	Definitely	Office Use
Family responsibilities	1	2	3	4	5	116
Insufficient information re: course offerings	1	2	3	4	5	117
Cost	1	2	3	4	5	118
Credibility of sponsor	1	2	3	4	5	119
Other: (please specify & rate)						
____________________	1	2	3	4	5	120
____________________	1	2	3	4	5	121
____________________	1	2	3	4	5	122

4. Please indicate the extent to which you prefer the following forms of continuing education:

	Dislike	Very Low Preference	Low	Mod.	High Preference	Office Use
University Short Courses	1	2	3	4	5	123
Scientific Meetings	1	2	3	4	5	124
Study/Journal Clubs	1	2	3	4	5	125
Consulting Colleagues	1	2	3	4	5	126
Professional Journals & Books	1	2	3	4	5	127
Self-Directed Learning	1	2	3	4	5	128
Audio Tapes	1	2	3	4	5	129
Video Tapes	1	2	3	4	5	130
Drug/Equipment Representatives	1	2	3	4	5	131
Other: (please specify & rate)						
____________________	1	2	3	4	5	132
____________________	1	2	3	4	5	133

5. Would you consider your interest in continuing education to be: 134

1 no interest
2 very low interest
3 low interest
4 medium interest
5 high interest

6. Where would you prefer to attend a continuing education program? 135

1 Lethbridge
2 Calgary
3 Red Deer
4 Edmonton
5 Grande Prairie
6 Other (please specify) ____________________

7. What day of the week do you prefer when attending a continuing education program?

Office Use
136

1 Monday
2 Tuesday
3 Wednesday
4 Thursday
5 Friday
6 Saturday
7 Sunday

PART III - Demographics and Current Practice Patterns

Please circle **one** number per item that best represents your answer, or fill in the responses as indicated.

Office Use

1. Is your practice:

137

1 General
2 Specialty
3 Other (i.e., Educator, Consultant)

2. Is your practice:

138

1 Solo
2 Group
3 As An Associate
4 Other: (please specify) ______________

3. Is your clinical practice:

139

1 Full-time 2 Part-time 3 not applicable

If part-time, number of hours a week in practice:

140

1 20 or less 2 21-39

4. Are you: 1 Female 2 Male

141

5. Is the year of your graduation:

142

1 Prior to 1953
2 1953-1958
3 1959-1964
4 1965-1970
5 1971-1976
6 1977-1982
7 1983-1988
8 1989-1993

6. Is the location of your practice:

143

1 Rural
2 Suburban
3 Urban
4 Not applicable

7. What comments or suggestions do you have to improve the continuing education offerings to dental professionals in Alberta?

Thank you for completing this questionnaire.

Please return it in the envelope provided by: June 30, 1993.

Resources Used With Permission

Continuing Dental Education Course Preference Survey, 1993, Academy of General Dentistry.

Needs Assessment - Division of Continuing Education, Faculty of Dentistry, University of Alberta, by Dr. S. K. Patterson & Dr. G. W. Thompson.

Professional Development of Further Education Council Coordinators in Alberta by Dr. A. Konrad, D. Elliott, J. McNeal & F. Sonoda.

What Are Your Continuing Education Needs? Continuing Medical Education, Faculty of Medicine, Dalhousie University.

APPENDIX B

Timeline

TIMELINE FOR CONTINUING EDUCATION NEEDS ASSESSMENT STUDY OF ALBERTA DENTISTS

May, 1993	- Thesis proposal approval obtained from Ethics Committee.
	- Formal approval obtained from ADA and Director-Continuing Education, UofA, Faculty of Dentistry.
June, 1993	- Meet with subject experts re: questionnaire item development, etc.
June, 1993	- Develop draft questionnaire.
	- Meet with subject experts re: draft questionnaire.
June, 1993	- Revise questionnaire.
	- Select pilot group (6 B.C. dentists).
	- Pilot questionnaire.
	- Revise questionnaire.
	- Distribute questionnaire.
September - November, 1993	- Complete data analysis.
February, 1994	- Complete all sections of thesis and make revisions, as required.
	- Form thesis committee
March, 1994	- Defend thesis.
	- Prepare thesis for FGSR approval.

APPENDIX C

Correspondence

Dalhousie University

Continuing Medical Education
5599 Fenwick Street
Halifax, Nova Scotia
Canada B3H 1R2
(902) 494-2061
(902) 494-1479

RECEIVED
MAY 19 1993
G.N.H.
NURSING ADMINISTRATION

May 12, 1993

Ms. Marjorie Sandilands
Director
Surgical Services
Grey Nuns Hospital
Edmonton, Alberta

Dear Ms. Sandilands:

We are pleased to have you use the questionnaire "What Are Your Continuing Education Needs?". Acknowledgement should be given to The Division of Continuing Medical Education, Faculty of Medicine, Dalhousie University.

Would you be kind enough to send me a copy of the questionnaire you develop?

Good luck in your studies!

Sincerely yours,

Karen Mann.

K.V. Mann, B.N., Ph.D.
Associate Professor and
Assistant Director, Research
Division of CME

KVM/jlb

June 2, 1993

Division of Continuing Education
Faculty of Dentistry
University of Alberta

Dear Marj,

In reply to your request for permission to use portions of our questionnaire in the development of your questionnaire which will be used to determine the perceived continuing professional education needs of Alberta dentists, we would gladly agree.

We wish you success in your research and we are certain that it will provide much needed information to improve the quality of continuing education for dentists in the province.

Sincerely,

Dr. G. W. Thompson

Dr. S. Patterson

May 9, 1993

Dear

I am beginning a survey of Alberta dentists to determine their continuing education needs. This survey will provide the data for completion of my master's thesis in Adult, Career and Technology Education.

I need to pre-test the questionnaire and would greatly appreciate your help. I am asking that you complete the attached questionnaire at your earliest convenience: (Please write on the questionnaire itself if you wish)

a) Approximately how long did the questionnaire take to complete?
______________________ minutes.

b) Were the directions clear and easy to understand?
Yes ( ) No ( )

c) Were the questions clear?
Yes ( ) No ( )

d) Did you have any problem in completing the questionnaire?
Yes ( ) No ( )

If yes, please explain. If you have any suggestions for modification, please

include these.____

____

____

____

e) Please specify any suggestions you may have for further questions.

f) Any other suggestions are welcomed.

I would appreciate it if you could return the completed questionnaire by **June 1, 1993**. Thank you in advance your assistance.

Sincerely,

Marjorie J. Sandilands BScN.

University
of
Alberta

June 15, 1993

Dear Member of the Alberta Dental Association:

You have been randomly selected from the Alberta Dental Association membership list to receive this questionnaire which will assist us in determining the perceived continuing professional education needs of dentists in Alberta.

We urge you to complete and return this questionnaire by June 30, 1993. The information gathered will be utilized to improve our continuing dental education offerings in Alberta.

Thank you for your continued support.

B.P. Martinello

Dr. B. Martinello
Executive Director
Alberta Dental Association

Dr. S. Patterson
Division of Continuing Education
Faculty of Dentistry
University of Alberta

June 15, 1993

Dear Member of the Alberta Dental Association:

I am interested in determining the perceived continuing education needs of dentists in Alberta. Both the Alberta Dental Association and the Department of Continuing Education, Faculty of Dentistry at the University of Alberta would appreciate this information so that they can plan continuing education programs that will meet your educational needs.

The purpose of this study will be to identify your perceived learning needs, preferred learning activities, demographic characteristics and current practice patterns. This information will be utilized to improve the continuing education offerings to dentists in Alberta. I am asking that you please find time in your busy schedule to complete this questionnaire. It should take approximately 20 minutes. Although participation in this study is voluntary and you are under no obligation to respond, your input is vital to the improvement of continuing dental education in Alberta.

Your questionnaire has been coded, prior to mailing. This information will only be utilized should a second mailing be required to increase the response rate. The key to the codes and names will be confidential and will be accessed solely by my research assistant. The key will be destroyed once the questionnaires have been returned. Your name was randomly chosen from the current Alberta Dental Association membership list. All data will be grouped together and your responses will not be individually identified. Your anonymity and confidentiality are guaranteed.

Copies of the completed study will be available at the Herbert Coutts Education Library, the Faculty of Dentistry, University of Alberta and the Alberta Dental Association. Also, a summary of the findings will be submitted to the Alberta Dental Association Newsletter for possible publication.

Please return the questionnaire in the enclosed stamped, addressed envelope by June 30, 1993. Your participation in this study would be greatly appreciated and is crucial to the development of continuing education programs that meet your professional needs.

Please feel free to contact me at (403) 988-5101 (evenings) if you have any questions or require assistance in completing the questionnaire.

Thank you in advance for your time and interest in furthering our understanding of your continuing education needs.

Sincerely,

Marjorie J. Sandilands
Graduate Student
University of Alberta &
Director - Surgical Services
Grey Nuns Hospital, Edmonton

APPENDIX D

Unmet Need for Information: Part I, Question 2

Unmet Need for Information Part I, question 2.

Topic	Number of Responses
TMJ dysfunction	2
Surgery	2
Operative dentistry	2
Laser technology	2
Cosmetic dentistry	2
Denture stomatitis	1
CAD CAM system	1
Review of basic sciences	1
Occlusal problems	1
Hands-on courses	1
Specialty courses (offered in Edm.)	1
Endodontics (hands-on)	1
CE courses on basics	1
Radiology	1
CE in rural areas	1
Access to computerized database for dental journals	1
Pedodontics	1

APPENDIX E

Suggestions Re: Perceived CE Needs: Part I, Question 3.

Suggestions Re: Perceived CE Needs Part I, Question 3.

- recognizing substance abuse in patients,
- laboratory courses in repairing dentures, constructing sports splints, TMJ splints etc.,
- financial management,
- associateships, buying and selling practices, and family trusts,
- investments,
- activities,
- travel,
- public dentistry--who is being missed and why?

APPENDIX F

Open-ended Comments: Quality of CE Courses

Open-ended Comments--Quality of CE Courses (see Table 4.27)

Topic	Number of Responses
Need CE with other health care professionals	1
Need time for questions & answers in courses	1
Courses don't deal with real issues	1

APPENDIX G

Open-ended Comments: Suggested CE Topics

Open-ended Comments--Suggested CE Topics (Table 4.28)

Topic	Number of Responses
Alberta research	1
Etiology of dental breakdown	1
Serving working poor	1
Decrease emphasis on increasing income	1
Advice from specialists to gen. practitioners	1
Fluoride Controversy	1
Dental manifestations of substance abuse	1
Infection control	1
Xray quality control	1
Courses directed toward general practitioners	1
Review of highlights--basic sciences	1
Trends in RCT	1
Gold/porcelain occlusion	1
Sterilization	1
Practice management	1
Financial management	1
Panel of specialists to discuss referral problems	1
Specialists to present newest trends & procedures	1

APPENDIX H

Demographic Characteristics

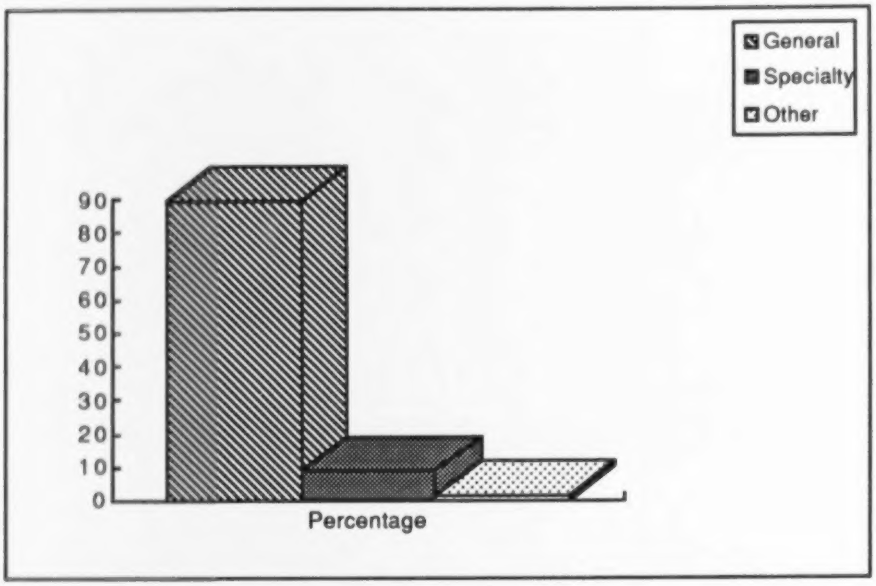

Figure 1. Percentage of Types of Practice of Dentists.

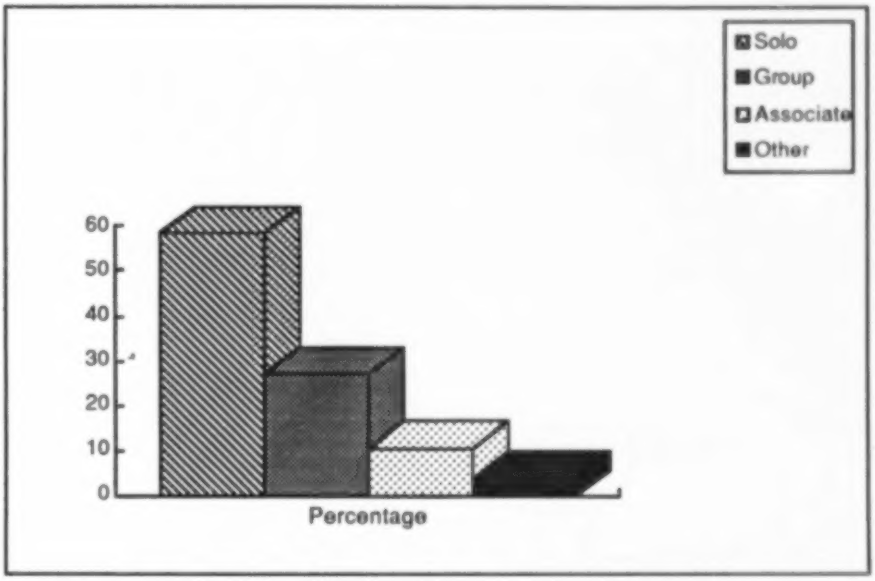

Figure 2. Nature of Practice of Dentists.

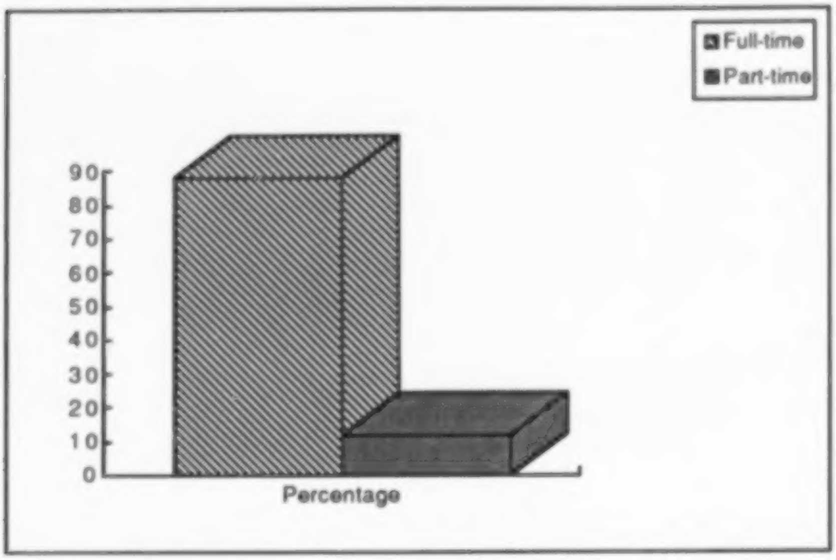

Figure 3. Percentage of Full-time and Part-time Practice of Dentists.

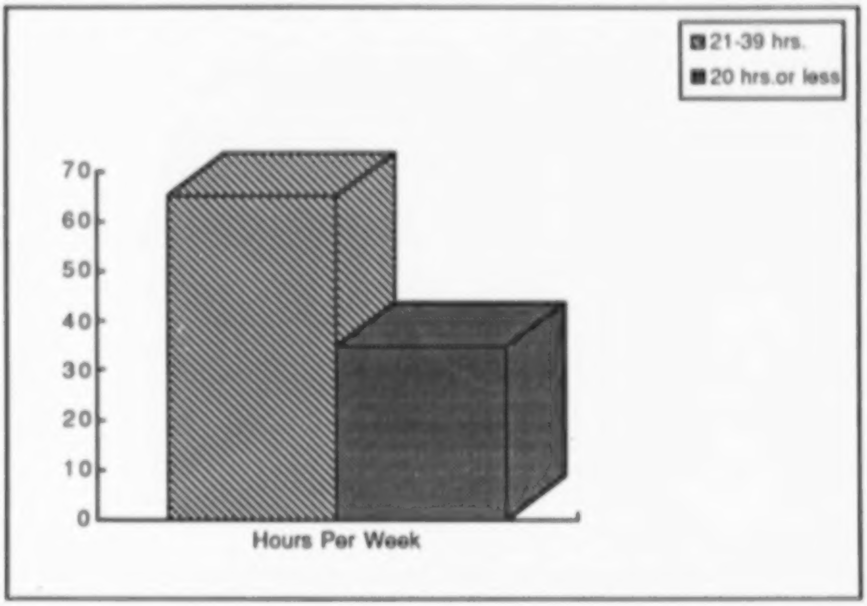

Figure 4. Number of Hours Worked Per Week by Part-time Dentists.

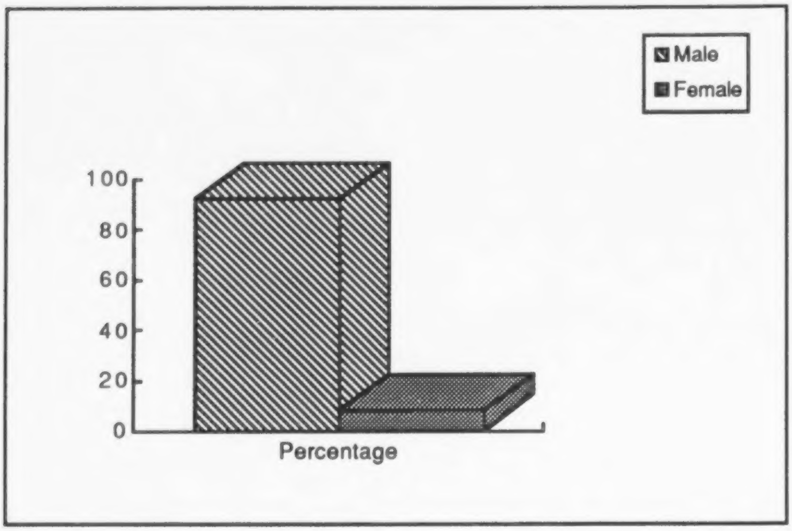

Figure 5. Gender of Alberta Dentists.

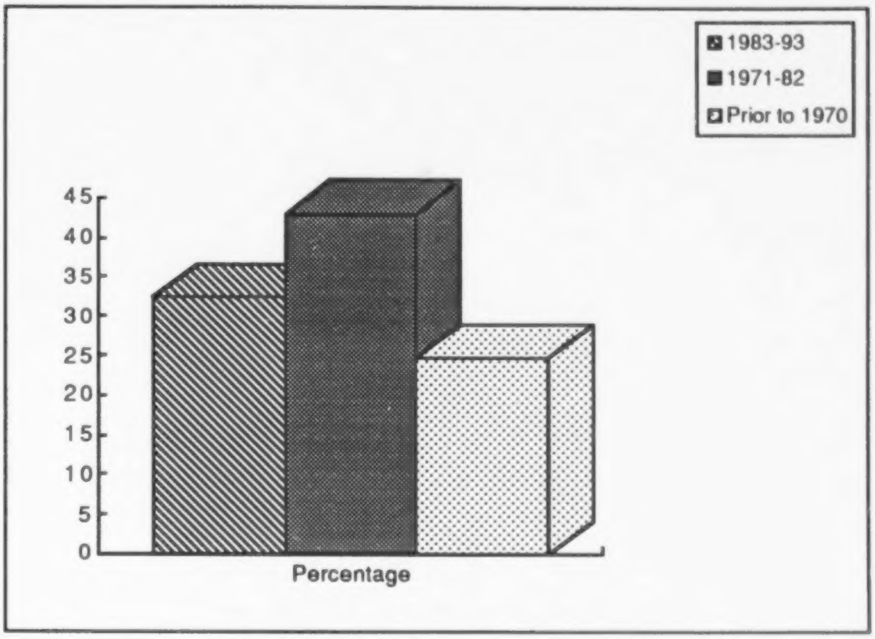

Figure 6. Year of Graduation of Alberta Dentists.

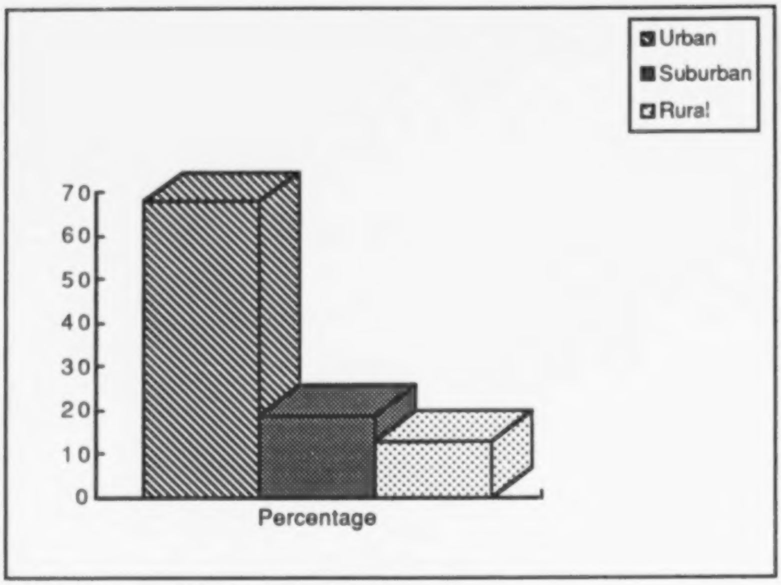

Figure 7. Practice Location of Dentists.